VLAAMSE OVERHEID

DEPARTEMENT MOBILITEIT EN OPENBARE WERKEN
WATERBOUWKUNDIG LABORATORIUM

Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing

Bestek 16EB/05/04

The frame & the equipment

Deelrapport 2.6 : Zout – en slibverdeling Deurganckdok & frame metingen 17/3/2006 – 23/5/2006

Report 2.6: Salt – Silt distribution & frame measurements Deurganckdok 17/3/2006 – 23/5/2006

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i.s.m. &

International Marine and Dredging Consultants (IMDC)
Wilrijkstraat 37-45 Bus 4 - 2140 Antwerpen – België
tel: +32.3.270.92.95 - fax: +32.3.235.67.11
E-mail : info@imdc.be

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1. INTRODUCTION

1.1. The assignment

This report is part of the set of reports describing the results of the long-term measurements conducted in Deurganckdok aiming at the monitoring and analysis of silt accretion. This measurement campaign is an extension of the study "Extension of the study about density currents in the Beneden Zeeschelde" as part of the Long Term Vision for the Scheldt estuary. It is complementary to the study 'Field measurements high-concentration benthic suspensions (HCBS 2)'[1].

The terms of reference for this study were prepared by the 'Departement Mobiliteit en Openbare Werken van de Vlaamse Overheid, Afdeling Waterbouwkundig Laboratorium' (16EB/05/04). The repetition of this study was awarded to International Marine and Dredging Consultants NV in association with WL|Delft Hydraulics and Gems International on 10/01/2006.

Waterbouwkundig Laboratorium– Cel Hydrometrie Schelde provided data on discharge, tide, salinity and turbidity along the river Scheldt and provided survey vessels for the long term and through tide measurements. Afdeling Maritieme Toegang provided maintenance dredging data. Agentschap voor Maritieme Dienstverlening en Kust – Afdeling Kust and Port of Antwerp provided depth sounding measurements.

The execution of the study involves a twofold assignment:

- Part 1: Setting up a sediment balance of Deurganckdok covering a period of one year
- Part 2: An analysis of the parameters contributing to siltation in Deurganckdok

1.2. Purpose of the study

The Lower Sea Scheldt (Beneden Zeeschelde) is the stretch of the Scheldt estuary between the Belgium-Dutch border and Rupelmonde, where the entrance channels to the Antwerp sea locks are located. The navigation channel has a sandy bed, whereas the shallower areas (intertidal areas, mud flats, salt marshes) consist of sandy clay or even pure mud sometimes. This part of the Scheldt is characterized by large horizontal salinity gradients and the presence of a turbidity maximum with depth-averaged concentrations ranging from 50 to 500 mg/l at grain sizes of 60 - 100 μm. The salinity gradients generate significant density currents between the river and the entrance channels to the locks, causing large siltation rates. It is to be expected that in the near future also the Deurganckdok will suffer from such large siltation rates, which may double the amount of dredging material to be dumped in the Lower Sea Scheldt.

Results from the study may be interpreted by comparison with results from the HCBS and HCBS2 studies covering the whole Lower Sea Scheldt. These studies included through-tide measurement campaigns in the vicinity of Deurganckdok and long term measurements of turbidity and salinity in and near Deurganckdok.

The first part of the study focuses on obtaining a sediment balance of Deurganckdok. Aside from natural sedimentation, the sediment balance is influenced by the maintenance and capital dredging works. This involves sediment influx from capital dredging works in the Deurganckdok, and internal

[1] Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies

relocation and removal of sediment by maintenance dredging works. To compute a sediment balance an inventory of bathymetric data (depth soundings), density measurements of the deposited material and detailed information of capital and maintenance dredging works will be made up.

The second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok, it is important to follow the evolution of the parameters involved, and this on a long and short term basis (long term & through-tide measurements). Previous research has shown the importance of water exchange at the entrance of Deurganckdok as essential for understanding sediment transport between the dock and the Scheldt river.

1.3. Overview of the Reports

Reports of the project 'Opvolging aanslibbing Deurganckdok' are summarized in Table 1-1.

Reports of the measurement campaign HCBS2 for which the winter campaign has been carried out simultaneously with measurements in this report are listed in APPENDIX F.

Table 1-1: Overview of Deurganckdok Reports

Report	Description
Sediment Balance: Bathymetry surveys, Density measurements, Maintenance and construction dredging activities	
1.1	Sediment Balance: Three monthly report 1/4/2006 – 30/06/2006 (I/RA/11283/06.113/MSA)
1.2	Sediment Balance: Three monthly report 1/7/2006 – 30/09/2006 (I/RA/11283/06.114/MSA)
1.3	Sediment Balance: Three monthly report 1/10/2006 – 31/12/2006 (I/RA/11283/06.115/MSA)
1.4	Sediment Balance: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.116/MSA)
1.5	Annual Sediment Balance (I/RA/11283/06.117/MSA)
1.6	Sediment balance Bathymetry: 2005 – 3/2006 (I/RA/11283/06.118/MSA)
Factors contributing to salt and sediment distribution in Deurganckdok: Salt-Silt (OBS3A) & Frame measurements, Through tide measurements (SiltProfiling & ADCP)	
2.1	Through tide measurement Siltprofiler 21/03/2006 Laure Marie (I/RA/11283/06.087/WGO)
2.2	Through tide measurement Siltprofiler 26/09/2006 Stream (I/RA/11283/06.068/MSA)
2.3	Through tide measurement Sediview spring tide 22/03/2006 Veremans (I/RA/11283/06.110/BDC)
2.4	Through tide measurement Sediview spring tide 27/09/2006 Parel 2 (I/RA/11283/06.119/MSA)
2.5	Through tide measurement Sediview neap tide (to be scheduled) (I/RA/11283/06.120/MSA)
2.6	Salt-Silt distribution & Frame Measurements Deurganckdok 13/3/2006 – 31/05/2006

Report	Description
	(I/RA/11283/06.121/MSA)
2.7	Salt-Silt distribution & Frame Measurements Deurganckdok 15/07/2006 – 31/10/2006 (I/RA/11283/06.122/MSA)
2.8	Salt-Silt distribution & Frame Measurements Deurganckdok 15/01/2007 – 15/03/2007 (I/RA/11283/06.123/MSA)
Boundary Conditions: Upriver Discharge, Salt concentration Scheldt, Bathymetric evolution in access channels, dredging activities in Lower Sea Scheldt and access channels	
3.1	Boundary conditions: Three monthly report 1/1/2007 – 31/03/2007 (I/RA/11283/06.127/MSA)
3.2	Boundary condtions: Annual report (I/RA/11283/06.128/MSA)
Analysis	
4	Analysis of Siltation Processes and Factors (I/RA/11283/06.129/MSA)
Calibration	
6.1	Winter Calibration (I/RA/11291/06.092/MSA)
6.2	Summer Calibration and Final Report (I/RA/11291/06.093/MSA)

1.3.1. Measurement actions

Following measurements have been carried out during the course of this project:

1. Monitoring upstream discharge in the Scheldt river
2. Monitoring Salt and sediment concentration in the Lower Sea Scheldt taken from on permanent data acquisition sites at Lillo, Oosterweel and up- and downstream of the Deurganckdok.
3. Long term measurement of salt distribution in Deurganckdok.
4. Long term measurement of sediment concentration in Deurganckdok
5. Monitoring near-bed processes in the central trench in the dock, near the entrance as well as near the landward end: near-bed turbidity, near-bed current velocity and bed elevation variations are measured from a fixed frame placed on the dock's bed.
6. Measurement of current, salt and sediment transport at the entrance of Deurganckdok for which ADCP backscatter intensity over a full cross section are calibrated with the Sediview procedure and vertical sediment and salt profiles are recorded with the SiltProfiler equipment
7. Through tide measurements of vertical sediment concentration profiles -including near bed highly concentrated suspensions- with the SiltProfiler equipment. Executed over a grid of points near the entrance of Deurganckdok.
8. Monitoring dredging activities at entrance channels towards the Kallo, Zanvliet and Berendrecht locks
9. Monitoring dredging and dumping activities in the Lower Sea Scheldt

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors.

1.4. Structure of this report

This report is the factual data report for two measurement campaigns:

- Long term salt/silt measurements in the Deurganckdok
- Near bed frame measurements in the vicinity of Deurganckdok from the 14th of March until the 5th of April 2006.

The first chapter comprises an introduction. The second chapter describes the project. Chapter 3 describes the measurement campaign, equipment and the course of the actual measurements. The measurement results and processed data are presented in Chapter 4, whereas chapter 5 gives a preliminary analysis of the data.

2. SEDIMENTATION IN DEURGANCKDOK

2.1. Project Area: Deurganckdok

Deurganckdok is a tidal dock situated at the left bank in the Lower Sea Scheldt, between Liefkenshoek and Doel. Deurganckdok has the following characteristics:

1. the dock has a length of 2750 m and is 450 m wide at the Scheldt end and 400 m wide at the inward end of the dock
2. The bottom of Deurganckdok is provided at a depth of –17m TAW
3. the quay walls reach up to +9m TAW

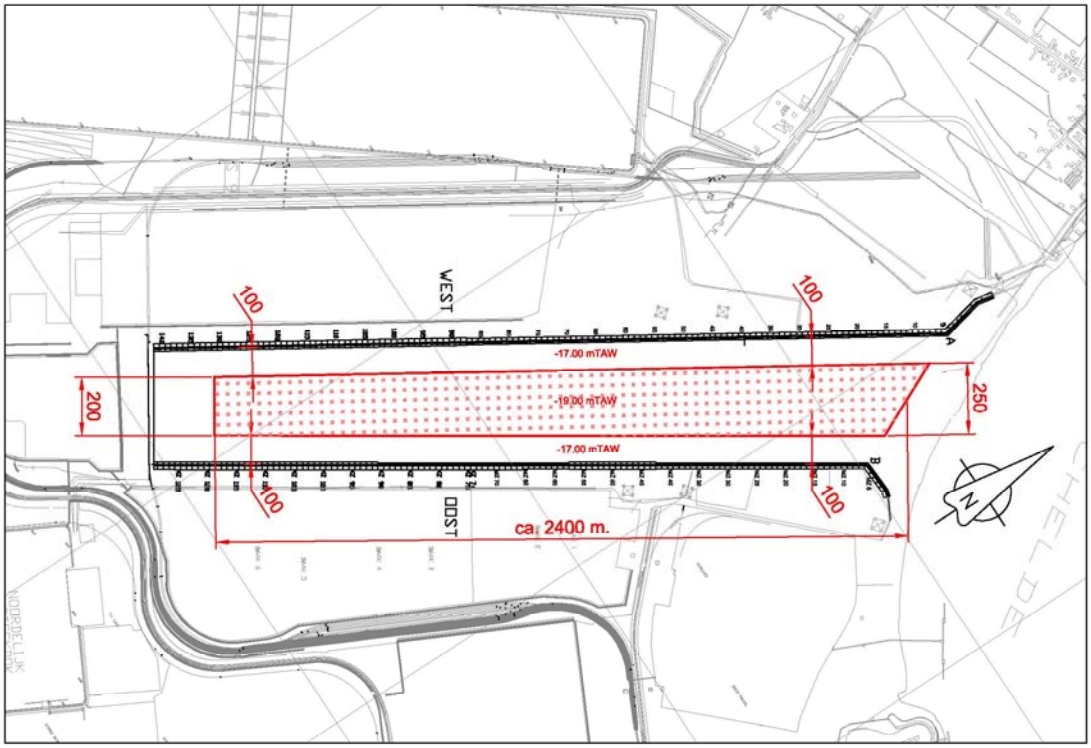

Figure 2-1: Overview of Deurganckdok

The dredging of the dock is performed in 3 phases. On 18 February 2005 the dike between the Scheldt and the Deurganckdok was breached. On 6 July 2005 Deurganckdok was officially opened. The second dredging phase was finalized a few weeks later. The first terminal operations have started since.

2.2. Overview of the studied parameters

The first part of the study aims at determining a sediment balance of Deurganckdok and the net influx of sediment. The sediment balance comprises a number of sediment transport modes:

deposition, influx from capital dredging works, internal replacement and removal of sediments due to maintenance dredging (Figure 2-2).

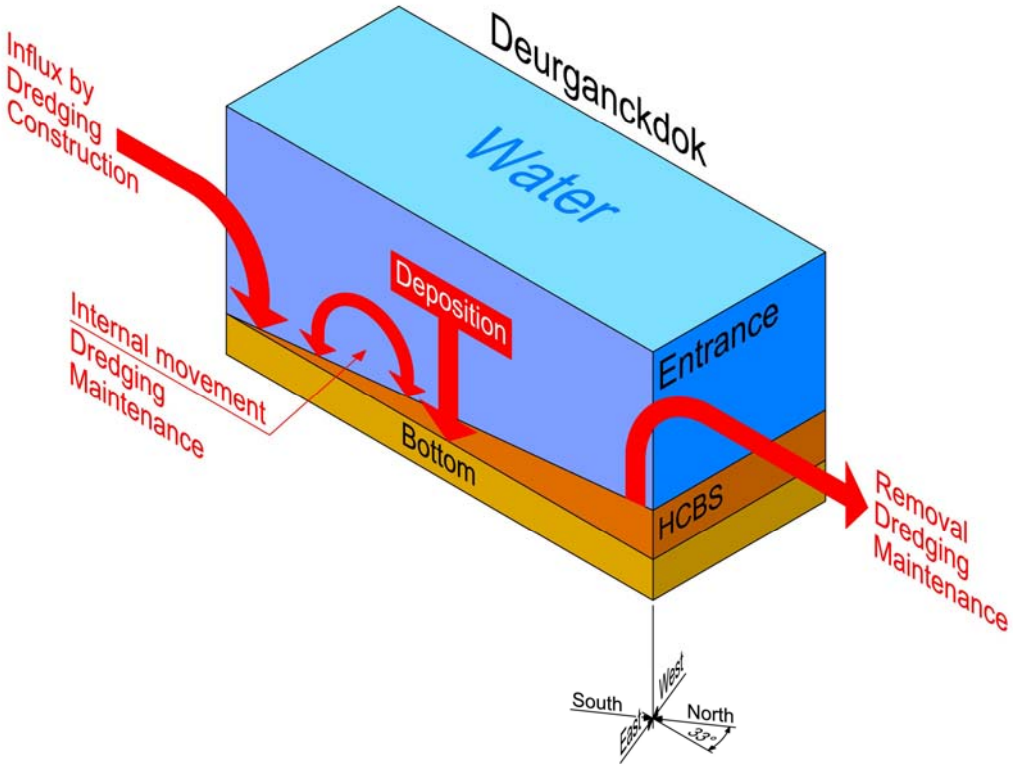

Figure 2-2: Elements of the sediment balance

A net deposition can be calculated from a comparison with a chosen initial condition t_0 (Figure 2-3). The mass of deposited sediment is determined from the integration of bed density profiles recorded at grid points covering the dock. Subtracting bed sediment mass at t_0 leads to the change in mass of sediments present in the dock (mass growth). Adding cumulated dry matter mass of dredged material removed since t_0 and subtracting any sediment influx due to capital dredging works leads to the total cumulated mass entered from the Scheldt river since t_0.

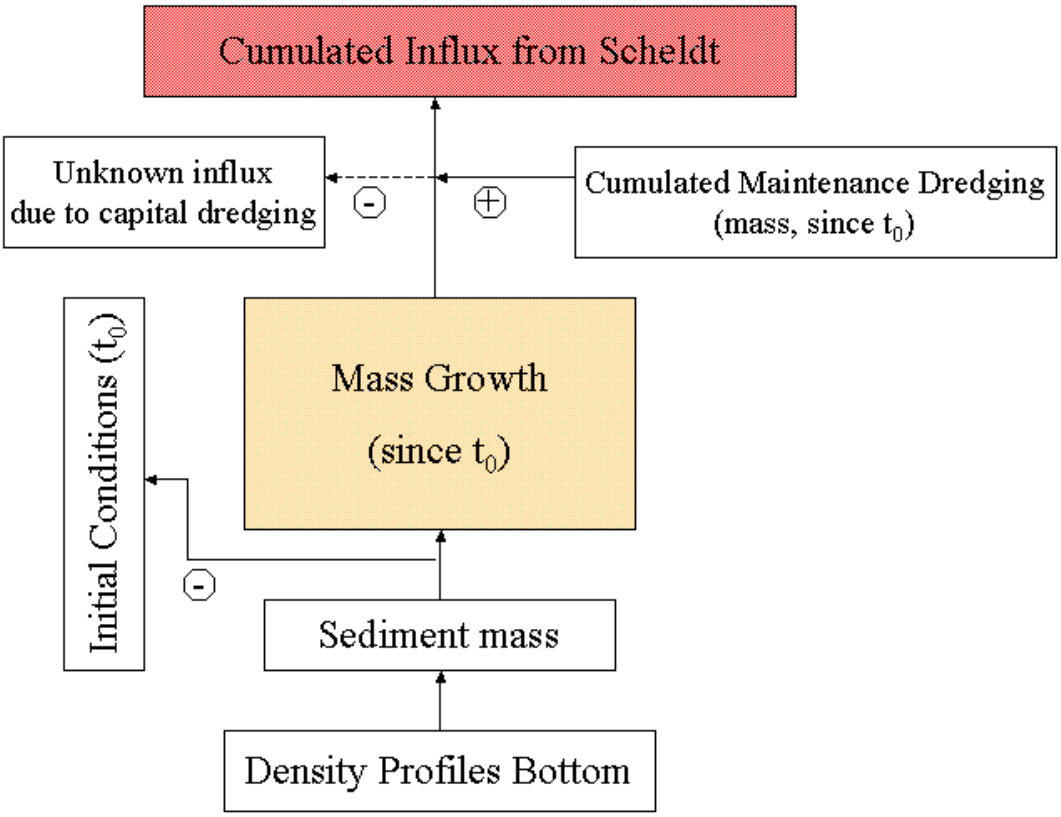

Figure 2-3: Determining a sediment balance

The main purpose of the second part of the study is to gain insight in the mechanisms causing siltation in Deurganckdok. The following mechanisms will be aimed at in this part of the study:

- Tidal prism, i.e. the extra volume in a water body due to high tide
- Vortex patterns due to passing tidal current
- Density currents due to salt gradient between the Scheldt river and the dock
- Density currents due to highly concentrated benthic suspensions

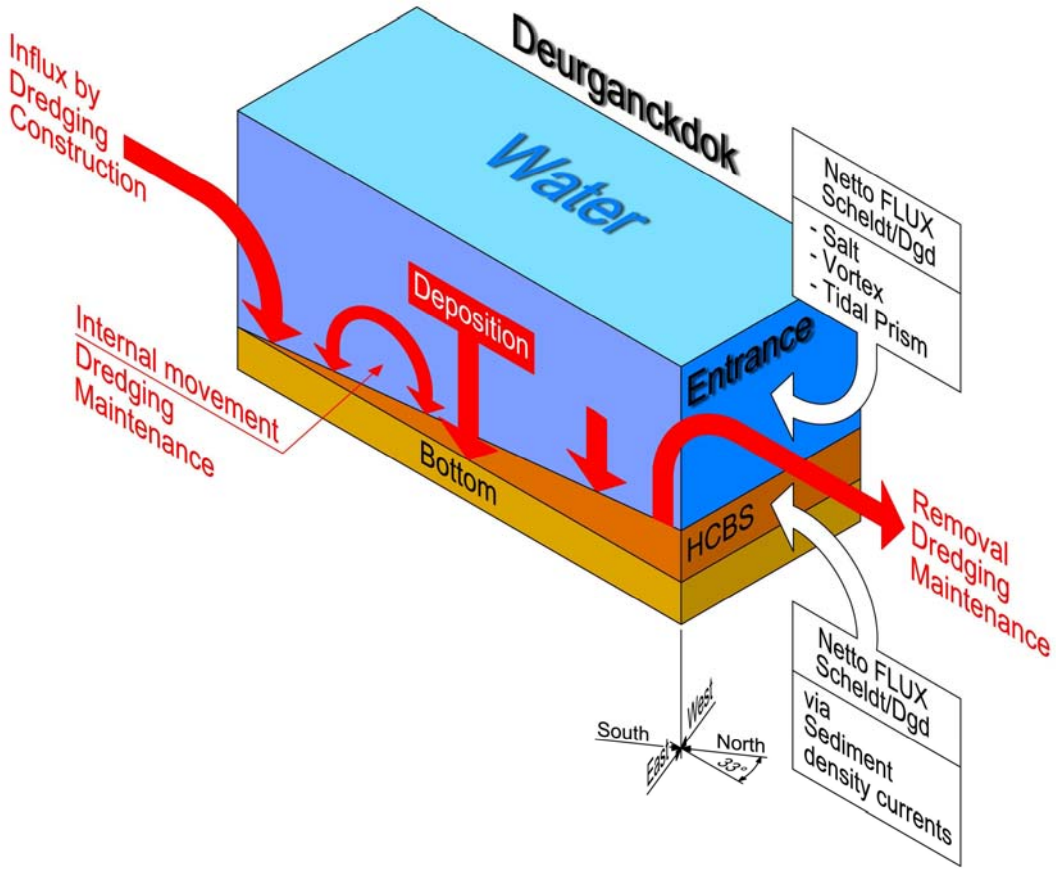

Figure 2-4: Transport mechanisms

These aspects of hydrodynamics and sediment transport have been landmark in determining the parameters to be measured during the project. Measurements will be focussed on three types of timescales: one tidal cycle, one neap-spring cycle and seasonal variation within one year.

Following data are being collected to understand these mechanisms:

- Monitoring upstream discharge in the Scheldt river.
- Monitoring Salt and sediment concentration in the Lower Sea Scheldt at permanent measurement locations at Oosterweel, up- and downstream of the Deurganckdok.
- Long term measurement of salt and suspended sediment distribution in Deurganckdok.
- Monitoring near-bed processes (current velocity, turbidity, and bed elevation variations) in the central trench in the dock, near the entrance as well as near the current deflecting wall location.
- Dynamic measurements of current, salt and sediment transport at the entrance of Deurganckdok.
- Through tide measurements of vertical sediment concentration profiles -including near bed high concentrated benthic suspensions.
- Monitoring dredging activities at entrance channels towards the Kallo, Zandvliet and Berendrecht locks as well as dredging and dumping activities in the Lower Sea Scheldt.

In situ calibrations were conducted on several dates to calibrate all turbidity and conductivity sensors.

2.2.1. Objective of the near bed continuous monitoring

The purpose of the deployment of the anchored measuring frame/rig is to monitor the detailed vertical structure of flow and suspended sediment concentration within a few decimeters from the bed. This measuring frame measures at one location only, by definition, and is difficult to reposition. Therefore, it should be positioned at a location where near-bed HCBS are most likely, and with a vertical resolution of the instruments that matches the concentration gradients in suspension. The vertical flow and sediment structure assessed with the preliminary 3D mud transport model allows for an optimization of the layout of the anchored measuring frame with respect to the instrumentation.

2.2.2. Objective of the long term measurements near the quay walls

The goal of the survey is to monitor the spatial distribution salt and silt in the Deurganckdok. Longitudinal, vertical and horizontal (from North to South quay) distribution is surveyed in this set up. The entrance of the dock is a favoured location because of the dynamics caused by the vicinity to the estuary. One deeper location in the dock is necessary to sample the longitudinal distribution of salt and silt along the dock.

3. THE MEASUREMENT CAMPAIGNS

3.1. Description of the long term turbidity-salinity measurements 17/3/2006 – 28/4/2006

3.1.1. Measurement location

During the period from 17/3/2006 till 28/4/2006, 6 multi parameter probes were placed on 3 fixed locations hanging from the quay wall in Deurganckdok at fixed depths.

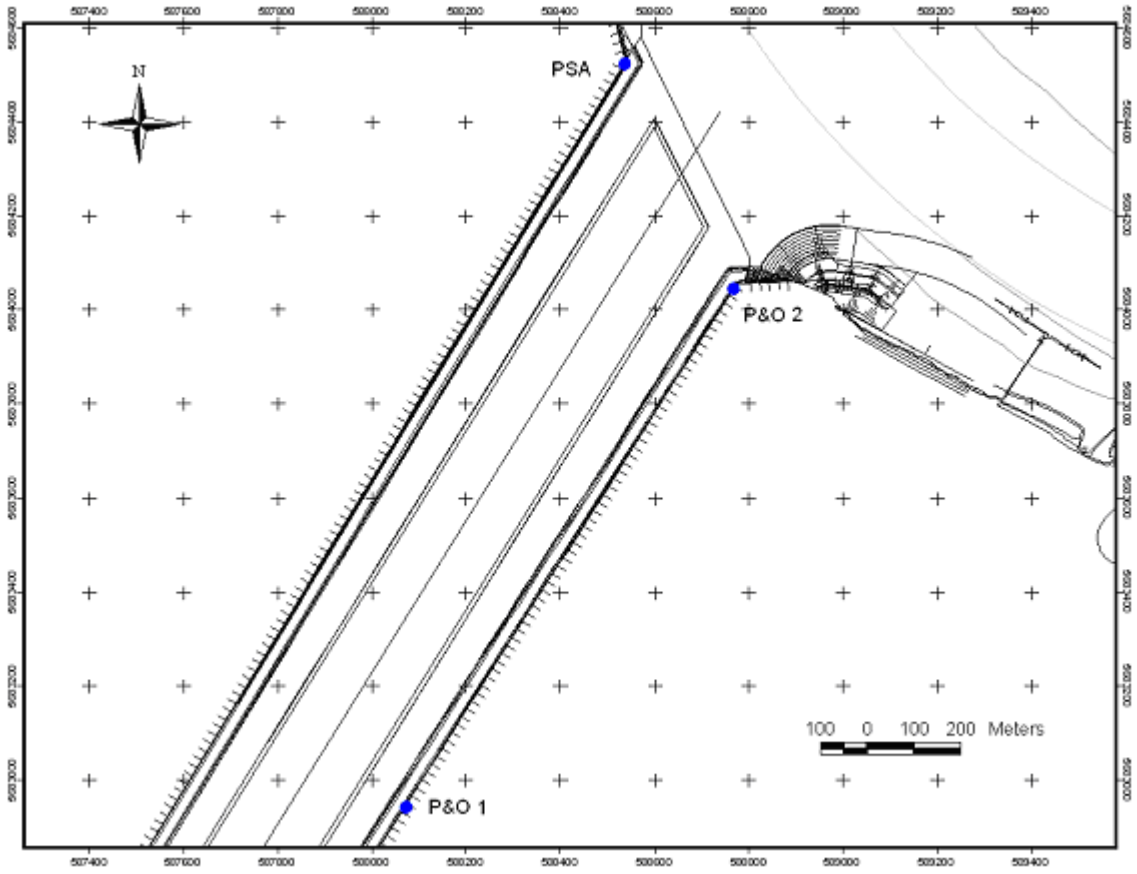

Figure 3-1: Map of the measurement locations for long term salt-silt measurements in Deurganckdok

Table 3-1: Measurement locations in UTM ED50

Location	***EASTING***	***NORTHING***	***Boulder***	***Operator***
P&O 1 (S-back)	588074	5682942	Moot 72	P&O Ports
P&O 2 (S-entrance)	588767	5684045	Moot 7	P&O Ports
PSA (N-entrance)	588536	5684523	Moot 5 (boulder 286)	PSA HNN

Table 3-2: Deployment depths of all instruments for the measurement period

Salt Silt Measurements Deurganckdok				
Location	*Easting (UTM ED 50)*	*Northing (UTM ED 50)*	*Depth of instrument [m TAW]*	*Period*
P&O 1 top	588074	5682942	-2	17/3/2006-28/04/2005
P&O 1 bottom	588074	5682942	-13.7	17/3/2006-28/04/2005
P&O 2 top	588767	5684045	-2	17/3/2006-28/04/2005
P&O 2 bottom	588767	5684045	-13.7	17/3/2006-28/04/2005
PSA top	588536	5684523	-2	17/3/2006-28/04/2005
PSA bottom	588536	5684523	-13.7	17/3/2006-7/04/2005
PSA bottom	588536	5684523	-12.2[2]	7/4/2006-28/04/2005

3.1.2. The equipment

3.1.2.1. Quay Frame set up

A simple rectangular measurement frame was conceived for suspending the instruments from the quay wall down into the Deurganckdok. Two frames rest against the dock wall and are suspended by stainless steel cables hanging from a rawlplug, secured on top of the quay wall.

Using a guiding system and a winch, it was possible to recover these instruments without the help of a survey vessel.

[2] Instrument was buried when it was deployed at –13.7 m TAW, so it was positioned 1.5 m higher, to avoid a gap in the measurements.

Figure 3-2: Guiding system and chain suspended from the rawlplug (left), frame with RCM-9 and steel cables (right)

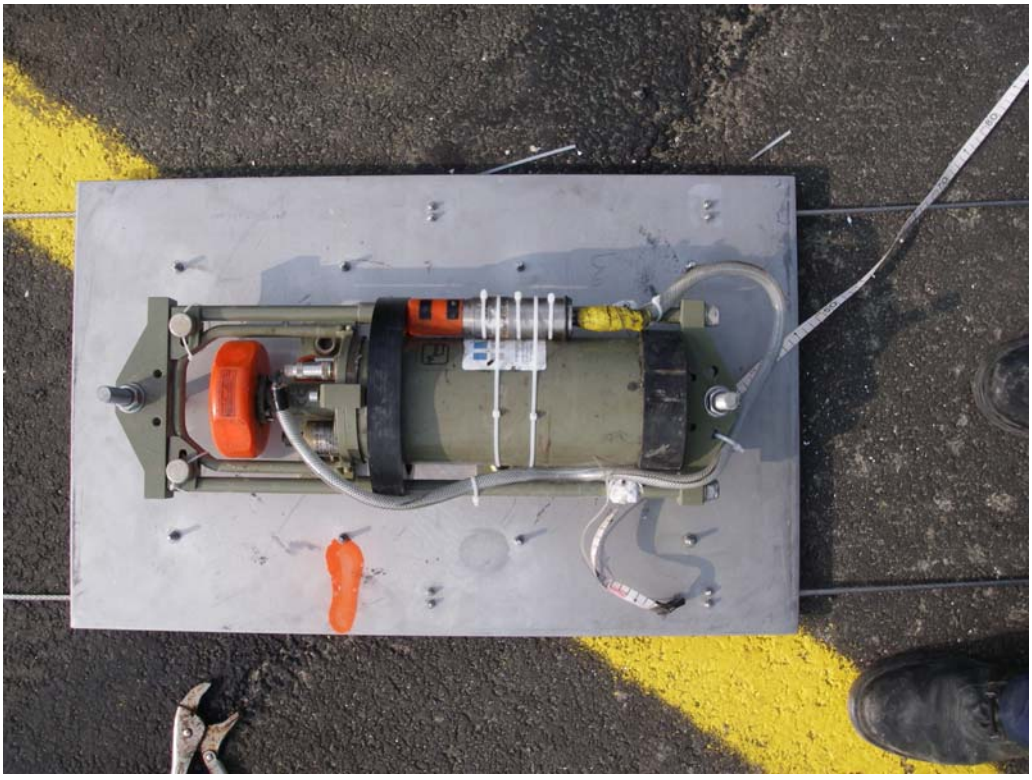

Figure 3-3: frame design

3.1.2.2. Aanderaa RCM-9

The Aanderaa Recording Current Meter RCM-9 MkII is a multi-parameter instrument that consists of a CTD probe, Doppler Current Sensors and a Turbidity Sensor. It was set up to measure an average of a number of pings spread over an interval of 10 minutes for conductivity, depth, temperature and turbidity.

IMDC (2006a) gives more technical details on the RCM-9.

3.1.2.3. D& A Instruments OBS 3A

The D & A Instruments OBS 3A is a multiparameter instruments that consists of a CTD probe and a turbidity sensor. The instrument was set up to measure every ten minutes for a minute at a frequency of 1 Hz and output the average.

IMDC (2006a) gives more technical details on the OBS 3A.

3.1.3. Course of the measurements

After deployment on 17/03/2006, the instruments were recovered, cleaned and read out every two weeks. Table 3-3 lists the measurement periods and possible issues.

Table 3-3: Overview of measurement periods and data gaps

P&O1 (S-BACK): -14m TAW			
Period	*No data*	*Faulty data*	*Comments*
17/03/2006			Start measurement period
28/04/2006			End measurement period
P&O1 (S-BACK): -2m TAW			
Period	*No data*	*Faulty data*	*Comments*
17/03/2006			Start measurement period
28/04/2006			End measurement period
P&O 2 (S-ENTRANCE): -14m TAW			
Period	*No data*	*Faulty data*	*Comments*
17/03/2006			Start measurement period
19/04/2006 – 25/04/2006		X	Out of range turbidity sensor
28/04/2006			End measurement period
P&O 2 (S-ENTRANCE): -2m TAW			
Period	*No data*	*Faulty data*	*Comments*
17/03/2006			Start measurement period
29/03 + 31/03/2006		X	Out of range turbidity sensor
8/04 – 14/04/2006		X	Out of range turbidity sensor
28/04/2006			End measurement period

PSA (N-ENTRANCE): -14m TAW			
Period	*No data*	*Faulty data*	*Comments*
18/03/2006			Start measurement period
31/03 + 07/04/2006	X		Equipment buried in mud
28/04/2006			End measurement period
PSA (N-ENTRANCE): -2m TAW			
Period	*No data*	*Faulty data*	*Comments*
17/03/2006			Start measurement period
11/04 – 13/04/2006		X	Occasional out of range turbidity sensor
28/04/2006			End measurement period

3.2. Description of the near bed continuous monitoring 19/4/2006 – 23/5/2006

3.2.1. Measurement location

During the period 19/04/2006 till 23/05/2006, two frames were placed in the vicinity of the entrance of Deurganckdok. The first one was placed at the downstream edge of the Deurganckdock. This location is situated nearby the future CDW location (Current Deflecting Wall), near the left bank of the Scheldt. The frame was placed at a depth of –14m TAW roughly. The placement of the frame occurred at 14h50 (19th of April), removal of the frame at 10h30 (23rd of May). The second frame was placed at the upstream edge of the dock, on the sill. The depth at the location of the frame is –14m TAW roughly. Placement of this frame occurred at 15h00 (19th of April), removal of the frame at 11h00 (23rd of May). To signal the presence of the frames buoys were place near the frames.

Spring tides occurred around the 28th of April and the 14th of May 2006. Time is always given in MET.

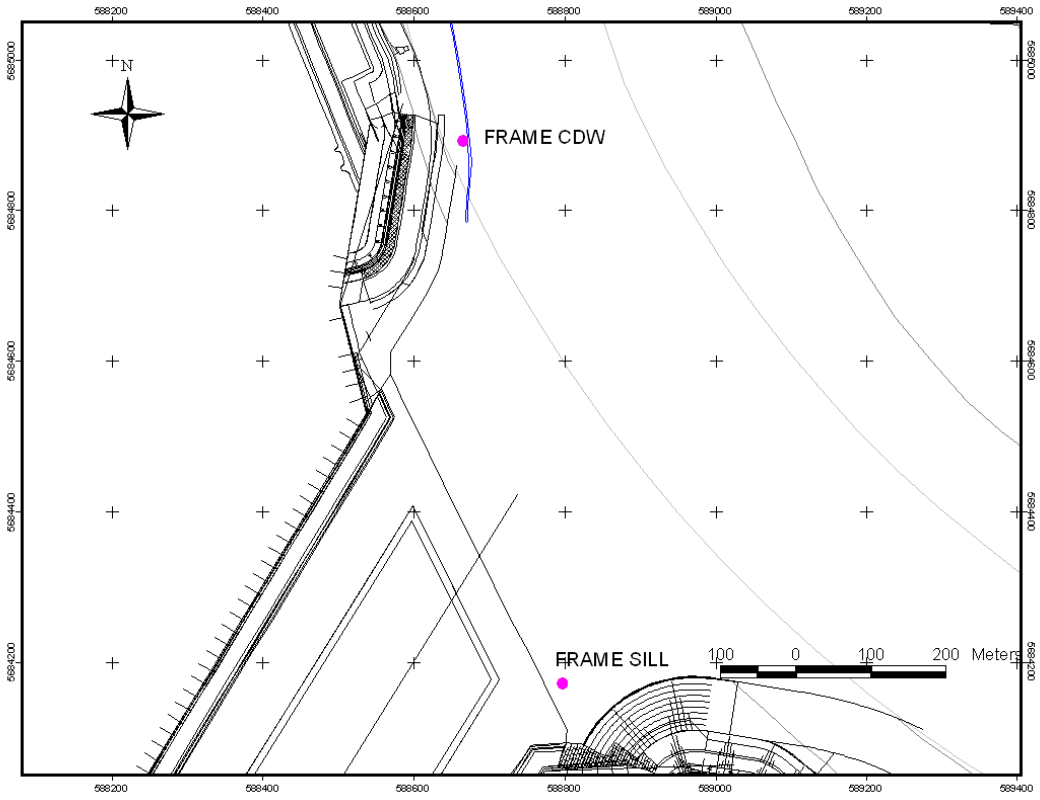

Figure 3-4: Map of the measurement location

3.2.2. The equipment

3.2.2.1. The frames

Two new frame were developed for autonomous measurement of sediment transport phenomena. The frames are equipped with an ARGUS ASM-IV high-resolution turbidity array, an ALTUS precision echosounder and furthermore two multiprobes: an Aanderaa RCM-9 and a Valeport MIDAS. This way proper instrumentation in the near bed zone was ensured. Data about the orientation, pitch and roll of the frames is obtained from a magnetic compass (orientation, Valeport MIDAS) and a tilt sensor (pitch and roll, ARGUS ASM-IV / Aanderaa RCM-9).

Set up of the CDW frame is as follows:

- The RCM 9 was installed at 1m above the bottom, with the following sensors: a CTD probe, Doppler Current Sensors and a Turbidity Sensor
- The Valeport Midas was installed at 0.1m above the bottom, with the following sensors: a CTD-probe, an electromagnetic Current Meter (ECM) and an OBS3+ turbidity sensor
- The ALTUS was installed at 0.37m above the bottom
- The ARGUS ASM-IV was installed in such a way that the lowest turbidity sensor was placed at 0.17m above the bottom

Set up of the Sill frame was modified several times during the measurements (see 3.2.3) At the first deployment, the instruments were placed at following heights:

- The RCM 9 was installed at 0.9m above the bottom, with the following sensors: a CTD probe, Doppler Current Sensors and a Turbidity Sensor
- The Valeport Midas was installed at 0.1m above the bottom, with the following sensors: a CTD-probe, an electromagnetic Current Meter (ECM) and an OBS3+ turbidity sensor
- The ALTUS was installed at 0.41m above the bottom
- The ARGUS ASM-IV was installed in such a way that the lowest turbidity sensor was placed at 0.23m above the bottom

During the measurements some instruments were placed higher. So finally at recovery, the set up of the Sill frame was as follows:

- The RCM 9 was installed at 1.1m above the bottom
- The Valeport Midas was installed at 0.3m above the bottom
- The ALTUS was installed at 0.66m above the bottom
- The ARGUS ASM-IV was installed in such a way that the lowest turbidity sensor was placed at 0.23m above the bottom

This is anticipated to allow a proper measurement of the lower current profile and give additional information on the suspended sediment concentration structure. Figure 3-5 shows the CDW frame with all the sensors. The Sill frame is built up identically.

Each sensor had its own data logger and power supply from internal batteries.

The frames were designed for easy transport and installation. The sensor positions, in particular sensor height above the bed, can be adjusted to specific requirements over a wide range. The structure of the frames consists of a tripod with a separation of about 4 metres between the legs. The height is about 2.3 m. Several girders give the frames the required sturdiness. The sensors can be clamped to adjustable supports. Hoisting support facilities are attached to the top of the frames.

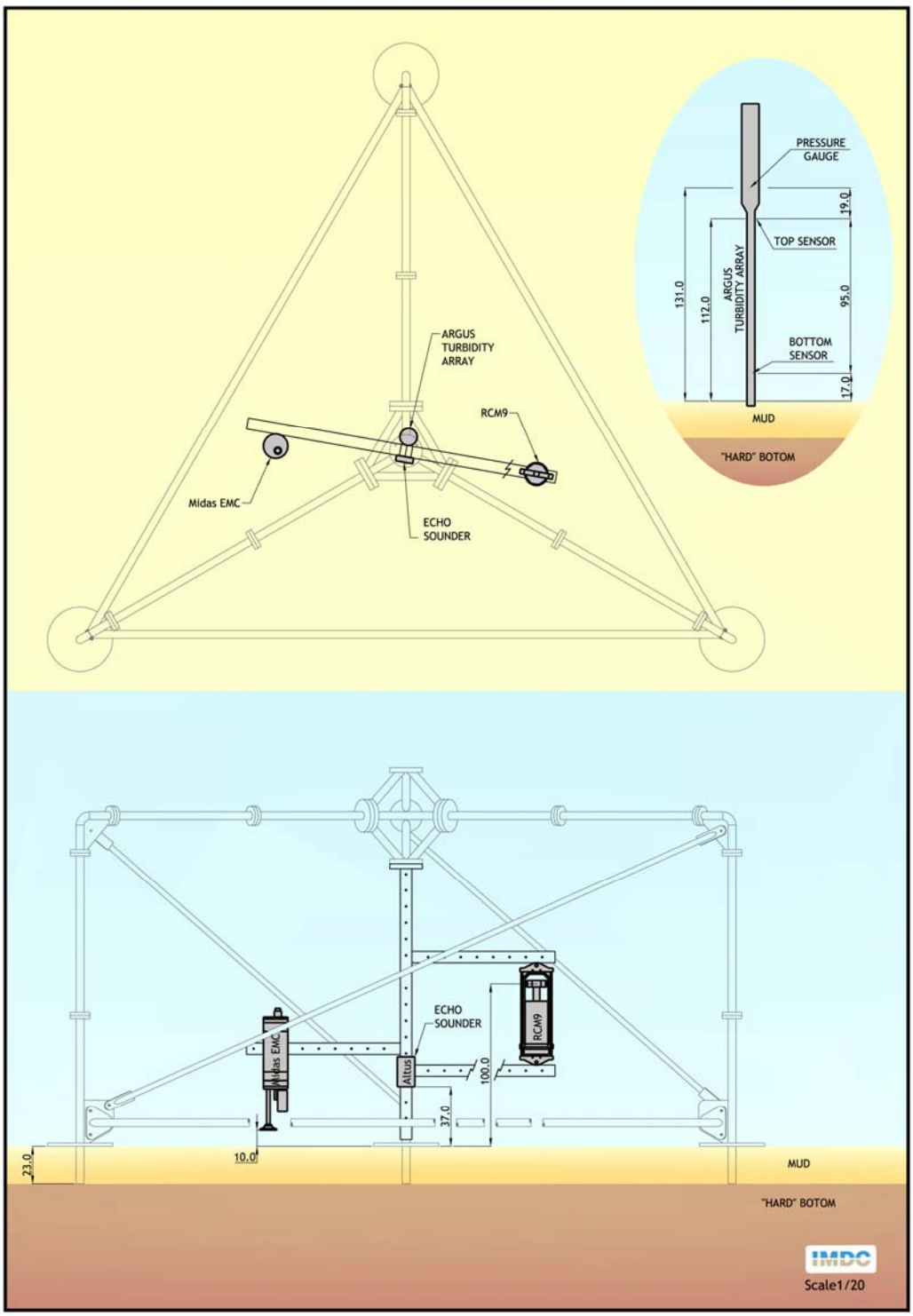

Figure 3-5: Sketch of the CDW frame with all the sensors (dimensions in [cm])

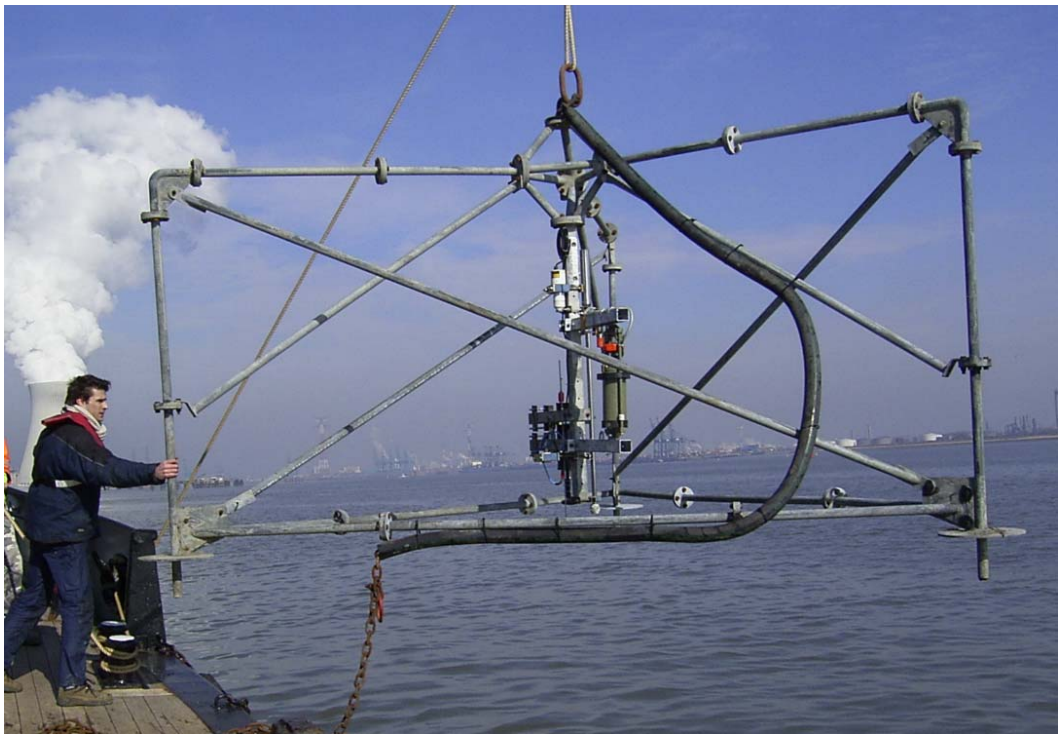

Figure 3-6: Installation of the CDW frame

3.2.2.2. ARGUS ASM-IV

The ARGUS ASM-IV was used to detect the vertical structure of the suspended sediment concentration in the zone of 1 meter above the bed.

The ARGUS ASM-IV was developed for high resolution measuring of accretion and erosion of the riverbed. (ARGUS UMWELT-MEATECHNIK, 2005). The instrument operates with backscatter infrared laser sensors embedded in a stainless steel rod. The 96 sensors are placed on an active board at a distance of 0.01m of each other. There are three additional sensors: an inclinometer, a pressure gauge and a on board temperature sensor.

A battery powered central unit in the head of the instrument controls activation and power supply of the sensors as well as the transmission of the signals. The sealed in unit consists of a microprocessor, a data memory, the additional sensors and the energy supply.

The ARGUS ASM-IV has a sampling interval of 5 seconds and every cycle there are 20 samples taken. The break range between each burst (i.e. pause) is set at 500 seconds. This means that the total cycle time is 600 seconds.

The measurement range of the ARGUS ASM-IV is from 0 to 5000mg/l.

More details on the ARGUS ASM-IV can be found in the February Survey Reports of the HCBS 1 measurement campaign (IMDC, 2005h)

Figure 3-7: ARGUS ASM-IV

3.2.2.3. ALTUS

The ALTUS is specially designed for mainly muddy environments to precisely quantify changes of bottom elevation. It is a high frequency acoustic submersible recording altimeter and is based on a 2 MHz echo sounder which transducer is located at a given distance from the bed. The echosounder was attached to the frame such that (looking downward) it can measure bottom variations with an accuracy of about 2mm. A separate container includes altimeter electronics, data logger, pressure sensor and energy.

The logging cadence was 600 seconds.

The technical details on the Altus are described in the February Survey Reports of the HCBS 1 measurement campaign (IMDC, 2005h).

3.2.2.4. Valeport MIDAS OBS3+

The Valeport MIDAS is a multiparameter instrument that has CTD- probe, an electromagnetic Current Meter (EMC) and an OBS3+ turbidity sensor with a range of 0-1500 FTU. The instrument was set to measure in cycles of 10 minutes, divided into 100 samples at a rate of 1Hz and a pause of 500 seconds.

Further technical details on the Valeport MIDAS OBS3+ are described in the Report 6.1 Winter calibration (IMDC, 2006a) of the HCBS2 Measurement campaign.

Figure 3-8: Valeport MIDAS EMC and OBS3+

3.2.2.5. Aanderaa RCM-9

The Aanderaa Recording Current Meter RCM-9 MkII is a multi-parameter instrument that consists of a CTD probe, Doppler Current Sensors and a Turbidity Sensor. The instrument was set up to measure every 10 minutes. All sensors (temperature, pressure, conductivity, turbidity, tilting) except the Doppler Current Sensor were set to record once every 10 minutes. The Doppler Current Sensor sent 600 pings during every 10 minute-interval and calculated the average value for current speed and direction over this interval. Data storage units in the instruments logged all the measured values..

IMDC (2006a) gives more technical details on the RCM-9.

Figure 3-9: Aanderaa RCM-9

3.2.3. Course of the measurements

At the entrance of Deurganckdok the two frames were both set to measure from the 19th of April till the 23rd of May 2006. Every week one of the two frames was recovered, the data of all equipment was downloaded and batteries were replaced, whereupon the frame was deployed again.

After removal of the frames, data of all equipment was tested. For the frame at the downstream edge of Deurganckdok (CDW) the Argus turbidity rod measured 20 samples per cycle with a sample interval of 5s with a pause of 500s between successive cycles, obtaining a total cycle time of 10 minutes. All sensors worked properly, the tilt meter indicates a good horizontal position of the frame (tilt less than 8°). Also the Altus echosounder and the Aanderaa RCM9, both with a measurement cadence of 10 minutes, worked properly. The Valeport MIDAS OBS3+ measured as well properly. One measurement cycle of the Valeport took 10 minutes (100 samples were taken at a rate of 1 sample per second and a pause of 500s).

Concerning the frame placed at the sill of Deurganckdok, the instruments measured with the same tuning as the CDW frame. The ARGUS and the Aanderaa RCM9 worked properly. At the first recovery it appeared that due to the muddy character of the bottom the frame penetrated more than expected. Consequently the MIDAS OBS3+ was submerged in the silt. For the deployment thereafter it was installed 0.2 m higher. Since the RCM 9 is connected to the frame together with the MIDAS, also the RCM9 had to be installed 0.2 m higher. The Altus echosounder measured properly until the 26th of April 2006. Afterwards the frame penetrated deeper into the bottom so no data was obtained of this instrument. Placing the echosounder 0.25 m higher for the third deployment had no influence.

An overview of the measurement locations is given in Table 3-4, while a chronological overview of measured data with an explanation can be found in Table 3-5.

Table 3-4: Overview of the measurement locations (UTM50) and periods

Near bed continuous monitoring			
Location	*Easting (UTM ED 50)*	*Northing (UTM ED 50)*	*Period*
Deurganckdok CDW	588685	5684880	19/04/2006 – 23/05/2006
Deurganckdok Sill	588805	5684170	19/04/2006 – 23/05/2006

Table 3-5: Chronological overview of missing and faulty data

Deurganckdok CDW			
Period	***No data***	***Faulty data***	***Comment***
19/04/2006			Deployment
04/05/2006			Recovery/Deployment
17/05/2006			Recovery/Deployment
23/05/2006			Recovery
Deurganckdok Sill			
19/04/2006			Deployment
19/04/2006 – 26/04/2006	MIDAS OBS3+		Instrument submerged in silt
26/04/2006			Recovery/Deployment
26/04/2006 – 10/05/2006	MIDAS OBS3+		Instrument submerged in silt
26/04/2006 – 10/05/2006	ALTUS		Instrument submerged in silt
10/05/2006			Recovery/Deployment
10/05/2006 – 23/05/2006	MIDAS OBS3+		Instrument submerged in silt
10/05/2006 – 23/05/2006	ALTUS		Instrument submerged in silt
23/05/2006			Recovery

4. PROCESSING OF DATASETS

4.1. Calibration of the sensors

A crucial aspect of the accuracy and reliability of the data concerns the calibration of the instruments before the measurement campaign. The calibration procedures and results are described in Report 6.1 Winter calibration of the HCBS2 measurements (IMDC, 2006a).

4.2. Long term measurements near quay wall

A first period of the long term measurements executed at two depths (-2 m TAW, -14m TAW) at three locations on the quay walls of Deurganckdok lasted from March 17th until April 28th 2006. Depth, temperature, salinity and suspended sediment concentration have been logged. All gathered time series have been converted to appropriate engineering units and combined to form series covering the complete period. During validation erroneous data due to mid term recovery, sensor malfunction and buried equipment has been removed. In this form the data is ready for processing.

4.2.1. Factual data: Weekseries

Measurements are visualized per instrument, location and per week in APPENDIX B.

- The title shows the week number followed by the year
- The second graph depicts the salinity and temperature
- The third and last graph shows the water level at the nearest tidal gauge and the suspended sediment concentration

Faulty data is omitted from these graphs.

4.2.2. Average tidal cycle of local parameters

For all parameters measured at one location data has been organised in separate series per tidal cycle (low water to next low water). High water moments were placed on a fixed position in the series, low water moments differ in time relative to high water due to variation in flood and ebb length with neap-spring phases. In this way a time series with time relative to high water is produced for each tide. When tidal elevation data showed substantial gaps data from pressure gauges was used to divide the long series into tidal series.

By defining average tidal amplitude A for neap, average and spring tides, it becomes possible to classify tidal cycles in three categories in the following way:

$$Neap : A \le \alpha(A_{neap} + A_{aver})$$

$$Spring : A \ge \alpha(A_{spring} + A_{aver})$$

$$Average : \alpha(A_{neap} + A_{aver}) < A < \alpha(A_{spring} + A_{aver})$$

where: A_{neap} , A_{aver} and A_{spring} are average amplitudes

α is a factor to decide where to distinguish between categories (here taken as 0.5)

Using such categorisation the tidal series can be grouped in neap, average and spring tides. Within these groups an average is made per parameter per tidal phase relative to high water (Figure 4-1).

In this way an average neap tidal cycle, an average middle tidal cycle and an average spring tidal cycle is obtained for all parameters.

The same exercise is repeated for relative values, which are the measured values divided by the tidal average (the average parameter value for that particular tidal cycle). All three types are shown in one plot with a plot for salinity, sediment concentration and temperature per page in APPENDIX G1.

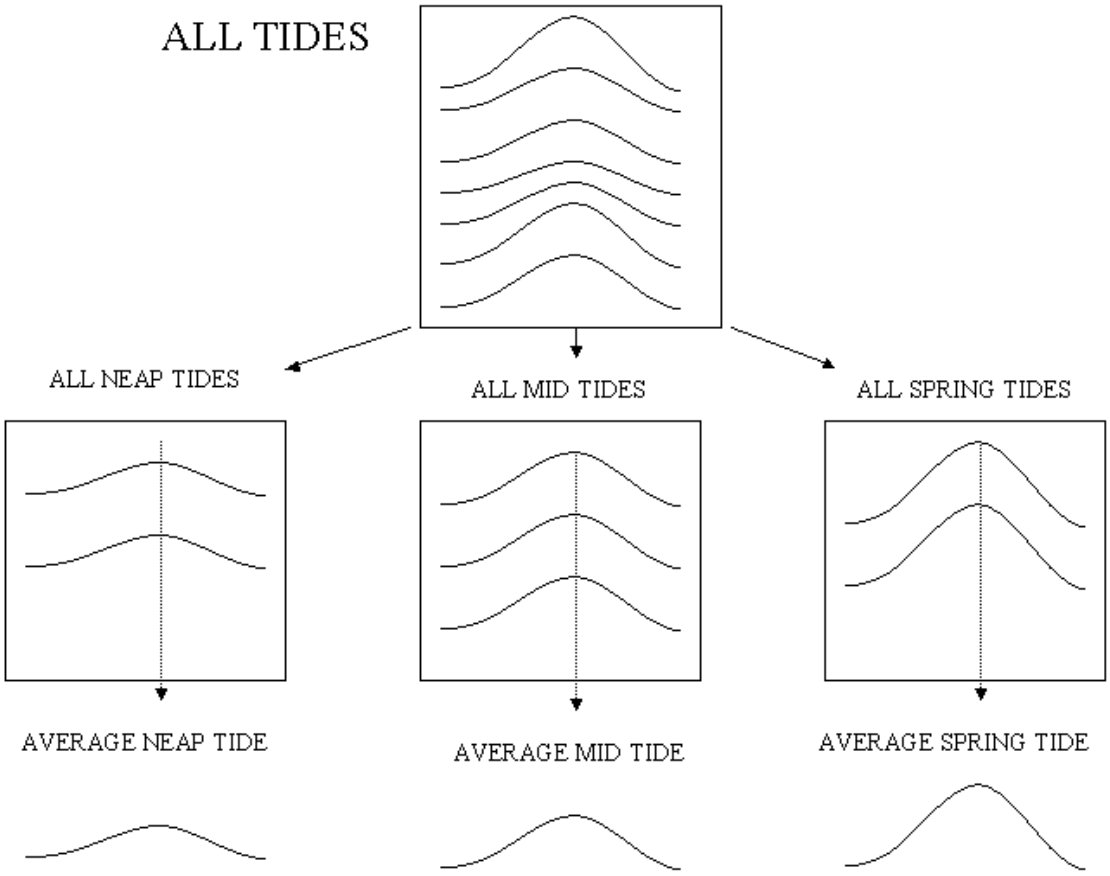

Figure 4-1: Categorisation of tidal tidal cycles

4.2.3. Average tidal cycle of gradients

For each of the three parameters being processed, four horizontal gradients (along dock's axis and cross dock, each at two depths) and three vertical gradients (one per location) have been calculated. The gradient along Deurganckdok was obtained by the difference of measurements between locations P&O2 (S-ENTRANCE) and P&O1 (S-BACK) (P&O1 minus P&O2) , the gradient across Deurganckdok was calculated as the difference between locations P&O2 (S-ENTRANCE) and PSA (N-ENTRANCE) (PSA minus P&O2). For each of the locations a vertical gradient has been calculated from the difference between the measurements at –2m TAW and the measurements at –14m TAW (-14m data minus –2m data).

The time series of gradients obtained as such have then been processed following exactly the same tidal separation technique as for the local parameters (described in 4.2.2). The results are shown in APPENDIX G2.

4.3. Near bed continuous monitoring

4.3.1. Methodology of processing the ARGUS ASM-IV data

The data gathered by the ARGUS ASM-IV during the measurements was processed with the ASMA 3.11 software (provided by ARGUS UMWELT-MEATECHNIK).

Raw data files are loaded in combination with the appropriate calibration file. This file is set up during the calibration. Finally only the data at the beginning and the end of the time series (apparatus not submerged) needed to be removed.

Time series, which show the sedimentation profile measured by the 96 sensors, can be found in APPENDIX C. In these plots the time axis shows MET-time. Also a table showing average values for SS concentration per tidal phase is shown. All sensors are organized per 10 (except top 6 are together) and averaged over flood and ebb phases. An average tidal phase (i.e. tidal phase with an average tidal difference) is also shown for every deployment period in APPENDIX C.

4.3.2. Methodology of processing the Altus data

The Altus data were validated and processed. Outliers were screened and removed.

The ALTUS gathers echo-signals at 4 different threshold values. The maximal echo value is used as a reference value for the hardness of the bottom. When the echo signal exceeds certain percentage of this emitted signal strength, a high percentage (70%) threshold will give an indication of the hard bottom, lower percentage threshold values (11%, 23%, 39%) indicate various levels in the soft bottom with a decreasing ‘density’. Increasing distances indicate a net erosion, decreasing distances a net sedimentation. The differences between the 4 signals at one given time and measurement give an indication on the ‘firmness or solidity’ of the soft bottom. These differences are hard to quantify and are more to be analysed qualitatively. Table 4-1 shows the threshold values used and their colour in the graphs.

Week series are shown in APPENDIX C together with the ARGUS week series. Altus datasheets show values for all measured signals including the tide at a nearby tidal station (Liefkenshoek).

A table is added with the Altus Echosounder-Bottom distances of every signal for each High Water (HW) and Low Water (LW). An average tidal phase is also shown for every deployment period in APPENDIX C.

Table 4-1: Overview of the used threshold values for the Altus Echosounder

Legend name used	***Threshold value [% of Signal]***	***Colour in the graph***
Signal 1	11%	Red
Signal 2	23%	Green
Signal 3	39%	Blue
Signal 4	70%	Black

4.3.3. Multiprobes: RCM9 and Valeport data

RCM9 and Valeport MIDAS OBS3+ data were validated and processed. Outliers were screened and removed.

Velocities were computed with a reference to the magnetic North.

Datasheets in APPENDIX D gives the '2 days'-series of RCM9 and Valeport data:

- Velocity Magnitude and Direction of UP sensors (RCM9)
- Velocity Magnitude and Direction of DOWN sensors (Valeport)
- Suspended Sediment Concentration of UP (blue) and DOWN (red) sensors. Tidal height is included together with these parameters from the nearest tidal station (Liefkenshoek)
- Absolute Suspended Sediment Flux of UP (blue) and DOWN (red) sensors. Tidal height is included together with these parameters from the nearest tidal station (Liefkenshoek)

The Absolute Suspended Sediment Flux is not defined for a defined cross-section. It is an absolute flux (Velocity Magnitude x SS Concentration).

In APPENDIX D tables are showing average values for Velocity Magnitude, Direction SS Concentrations and Absolute Fluxes for both UP and DOWN sensors per tidal phase (ebb/flood).. An average tidal phase is also shown in APPENDIX D.

In APPENDIX E the suspended sediment concentration measured by the RCM9 and Valeport sensors (blue) was compared to the suspended sediment concentration measured by the ARGUS sensors (red) at the same height:

- For the CDW frame, the UP sensor was located at 1.0 m above the bottom and was compared to the ARGUS sensor 13, which resided at the same depth.
- For the CDW frame, the DOWN-sensor was located at 0.1 m above the bottom and was compared to the lowest ARGUS sensor 96, which was located at 0.17 m above the bottom.
- For the Sill frame, the UP sensor was originally located at 09 m above the bottom and was compared to the ARGUS sensor 29, which resided at the same depth. After installing the instruments higher, the UP sensor was located at 1.1 m above the bottom and was compared tot the ARGUS sensor 9, which resided at the same depth.
- For the Sill frame, the DOWN sensor was originally located at 0.1 m above the bottom and was compared to the ARGUS sensor 96, which was located at 0.23 m above the bottom. After installing the instruments higher, the UP sensor was located at 0.3 m above the bottom and was compared to the ARGUS sensor 90, which resided at the same depth.

Tidal height is included together with these parameters from the nearest tidal station (Liefkenshoek).

In APPENDIX E tables are showing average values for SS Concentrations of both Argus and RCM9 and Valeport sensors per tidal phase (ebb/flood). An average tidal phase is also shown in APPENDIX E.

5. PRELIMINARY ANALYSIS

5.1. Long term salinity measurements 17/3/2006 – 28/4/2006

For each of the three locations salinity, sediment concentration and temperature have been logged at two depths. Apart from week series per parameter average tidal cycles have been determined for each parameter. This has been done for absolute and relative values as well as for horizontal gradients along and cross the dock and vertical gradients (APPENDIX G). All of these results are discussed below.

5.1.1. Week series

5.1.1.1. P&O1 (S-BACK)

Salinity levels are in the range 6 ppt to 8 ppt with a small variation per tide. Temperature rises gradually from 6°C early March to 14°C end of April. Sediment concentration shows values around 25 mg/l with one peak per tide for near-bed measurements. This peak increases towards spring tide (500 mg/l) and decreases towards neap tide (100 mg/l).

5.1.1.2. P&O 2 (S-ENTRANCE)

Salinity levels are in the range 6 ppt to 8 ppt with a smaller variation per tide near the bottom compared to near the surface. Temperature rises gradually from 6°C early March to 14°C end of April. Sediment concentration varies between 25 mg/l and 1000 mg/l near the bed and between 25 mg/l and 400 mg/l at –2m TAW.

5.1.1.3. PSA (N-ENTRANCE)

Salinity levels are in the range 5 ppt to 11 ppt with a smaller variation per tide near the bottom compared to near the surface. Temperature rises gradually from 6°C early March to 14°C end of April. Sediment concentration varies between 50 mg/l and 1000 mg/l near the bed and between 30 mg/l and 500 mg/l at –2m TAW.

5.1.2. Average tidal cycles

Plots of averaged tidal cycles can be found in APPENDIX G.

5.1.2.1. Local Parameters

In general we can state that for salinity and sediment concentration an average tidal cycle has the highest values for spring tide and lowest values for neap tide. Saline water enters with flood so tidally averaged salinity is thus higher when a higher tidal amplitude is acting on the estuary.

Concerning salinity we can say that the highest range within one tidal cycle occurs nearest to the river and closer to the water surface. The highest variation is observed for location PSA (N-ENTRANCE) at –2m TAW where for an average spring tide salinity varies between 2.5 and 6.2 ppt. For location P&O 2 (S-ENTRANCE), the other location at the entrance of the dock, we see a much smaller variation at –2m TAW ranging from 5.5 to 7 ppt. At –14m TAW however, we see a higher salinity at PSA (N-ENTRANCE) compared to P&O2 (S-ENTRANCE) during the complete tidal cycle. Peak values occur at 3 hours after high water at P&O1 (S-BACK), at about 4 hours after high water at P&O 2 (S-ENTRANCE) and at 1 to 2 hours after high water at location PSA (N-ENTRANCE).

At the inland end of the dock we see a range between 4.5 ppt and 6.5 ppt at –2m TAW and between 6.5 ppt and 7.5 ppt at –14m TAW for an average spring tide, with 1 - 1.5 ppt lower for middle and low tidal amplitudes.

About sediment concentrations we can say that an outstanding peak occurs near the bed at 2.5, 0 and 1 hour after high water for locations P&O1 (S-BACK), P&O 2 (S-ENTRANCE) and PSA (N-ENTRANCE) respectively. Highest peaks occur for spring tides, followed by average tides and neap tides. This peak is most pronounced for P&O 2 (S-ENTRANCE) and PSA (N-ENTRANCE), with 400 mg/l and 500 mg/l respectively for an average spring tide, dropping to 150mg/l and 300 mg/l respectively for an average neap tide. For the measurements at –2m TAW peaks are less pronounced at location P&O1 (S-BACK), and for locations near the entrance we see higher concentrations during flood acceleration and during high water slack.

5.1.2.2. Gradients

Cross-dock gradients from P&O 2 (S-ENTRANCE) towards PSA (N-ENTRANCE) have been calculated at –2m TAW and at –14m TAW. Plots of the deepest ones show a salinity gradient being positive almost the complete tidal cycle, which means that salinity near the bottom is higher at PSA (N-ENTRANCE) than at P&O 2 (S-ENTRANCE), except during low water. The cross-dock salinity gradient at –2 m TAW is negative during the complete cycle, this means salinity closer to the water surface is always higher at P&O 2 (S-ENTRANCE) than at PSA (N-ENTRANCE), note that closer to the bottom this is the opposite.

Sediment concentration gradients near the bottom are slightly positive throughout an average tidal cycle, meaning that the concentration at the downstream quay (PSA (N-ENTRANCE)) is in general higher than near the upstream quay (P&O 2 (S-ENTRANCE)). Half an hour before high water a brief reverse is observed in this pattern. Sediment concentration at -2m TAW is showing a similar pattern except for the period with negative gradient lasting from 3 hours before high water until high water.

Along-dock gradients run from the entrance towards the inland end of the dock. In general they are negative. Salinity and sediment concentration levels decrease with distance from the river. Closer to the water surface we see a stronger gradient during flood, and smaller differences during ebb. Closer to the bed we see a fluctuating salinity gradient, changing sign three times per tidal cycle. The sediment concentration gradient is low until 1hour before high water, reaching 0.3 mg/l/m at high water. This comes down to a difference of almost 400mg/l. Right after high water the gradient rises to become positive for two hours and then falling to close to zero again. This seems to be the signature of a cloud passing along the eastern quay wall from river into the dock. Indeed, looking back to the average cycles for local parameters we see a peaking concentration at P&O 2 (S-ENTRANCE) at high water and a peaking concentration at P&O1 (S-BACK) about 2.5 hours later.

Vertical gradients show the expected rise in concentration with depth for all locations, with peaks at times of high bottom concentrations, i.e. at high water near the entrance and 2.5 hours after high water at the inland end of the dock. Salinity gradients show a double peak corresponding with low water slack and high water slack (for P&O 2 (S-ENTRANCE)). For PSA (N-ENTRANCE) only at low water slack a stronger vertical salinity gradient is observed.

5.2. Near bed continuous monitoring 19/4/2006 – 23/5/2006

5.2.1. CDW frame data

Average concentrations per tidal phase in layers of 10 cm, measured by the ARGUS vary from 57 to 1343 mg/l. As to be expected the highest concentrations occur in the lowest cm of the water column. Considering the complete deployment period, some higher concentrations occur at several heights of the water column (see weekseries APPENDIX C). Some floating dirt can probably explain this. During flood suspended sediment concentrations are higher than those measured during ebb. Near spring tide (around the 28th of April and the 14th of May 2006) the concentrations are generally the highest.

It appears from the recorded data that the bottom is situated more or less 50 cm below the Altus sensor, consequently at approximately –14.5 m TAW. Except for the last deployment period where it seems that the frame penetrated more into the bottom (hard bottom about 32 cm below the echosounder). Furthermore some dataheets show slight sedimentation just after every high water (see weekseries APPENDIX C).

Average velocities per tidal phase (ebb/flood) 1 m above the bed vary from 0.2 up to 0.5 m/s, 0.1 m above the bed they vary from 0.2 up to 0.3 m/s. Average SS concentrations measured by the upper sensor are somewhat smaller than those measured by the lower sensor (Figure 5-2). When comparing the sensors to the ARGUS sensors at the same height, it appears that the ARGUS gives slightly lower values (Figure 5-3, Figure 5-4).

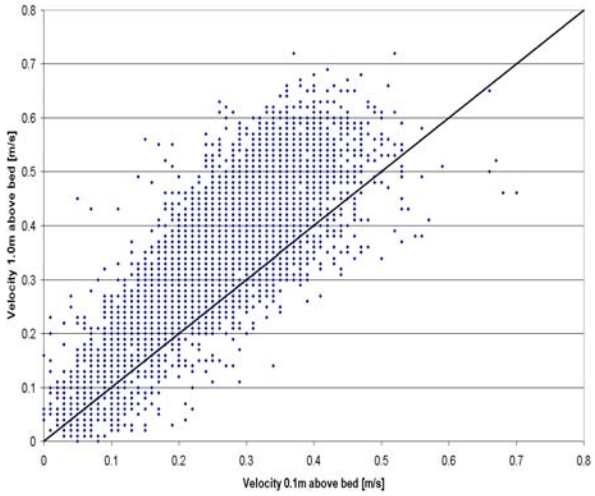

Figure 5-1: Near bed current velocities (14/03/2006 - 05/04/2006) CDW frame

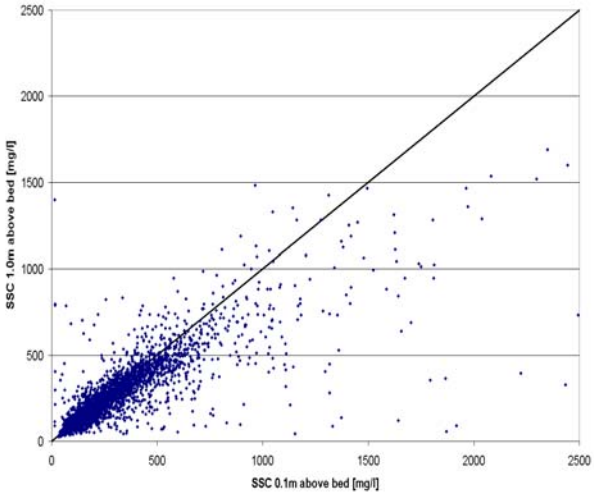

Figure 5-2: Near bed SS concentrations (14/03/2006 - 05/04/2006) CDW frame

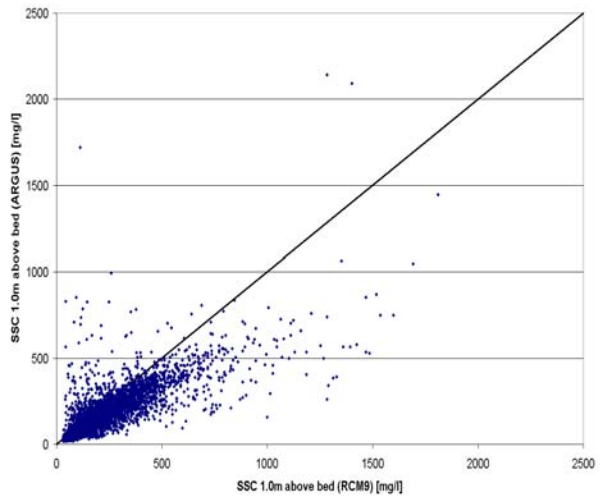

Figure 5-3: Comparison SS concentration ARGUS to SS concentration RCM9 (1.0m above bed) CDW frame

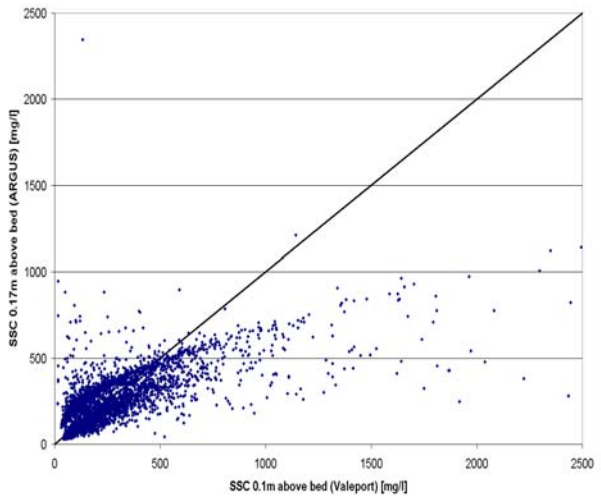

Figure 5-4: Comparison SS concentration ARGUS to SS concentration Valeport (0.17m resp. 0.1m above bed) CDW frame

5.2.2. Sill frame data

Average concentrations per tidal phase in layers of 10 cm, measured by the ARGUS vary from 46 to 4907 mg/l. The highest concentrations occur in the lowest cm of the water column as to be expected. In this area the concentrations often are out of the measurement range of the instrument (see weekseries APPENDIX C). During flood suspended sediment concentrations are higher than those measured during ebb. Generally concentrations are the highest near spring tide (28th of April and 14th of May 2006).

Due to al higher penetration of the frame into the muddy bottom than anticipated, only few Altus data is obtained during these measurements. This was dealt with in future measurement campaigns by enlarging the supporting surface. From the weekseries (APPENDIX C) it appears that during the first deployment period the bottom is situated about 18 cm below the echosounder, or at approximately –14.2 m TAW.

As mentioned in §3.2.3 the MIDAS OBS3+ was submerged in silt during the whole measuring period. RCM9 data shows that average velocities per tidal phase 0.9m respectively 1.1m above the bed vary from 0.1 up to 0.2 m/s. There should be mentioned that the distance of 0.9m/1.1m above the bed is a theoretical distance. Depending on how much the frame penetrates into the bottom this distance may decrease. Average suspended sediment concentrations per tidal phase measured by the RCM9 vary from 70 up to 550 mg/l. Concerning the comparison with the ARGUS sensor at the same height, there can be seen that during the first deployment the ARGUS gives as well slightly lower values. For the subsequent deployments this is not the case (Figure 5-5).

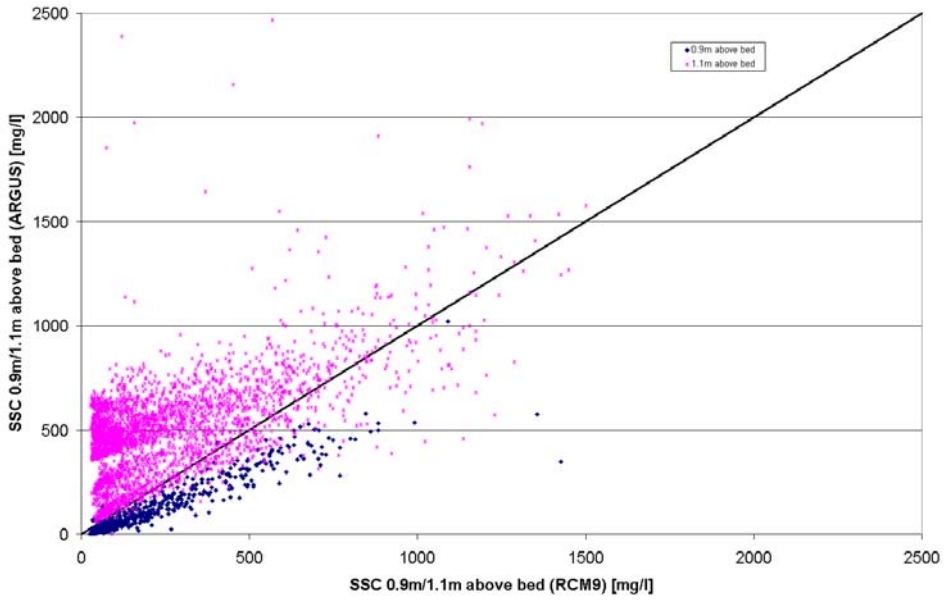

Figure 5-5: Comparison SS concentration ARGUS to SS concentration RCM9 (0.9m/1.1m above bed) Sill frame

5.2.3. Comparison with previous measurements

Similar measurements were executed as part of the HCBS project (Field measurements: high-concentration benthic suspensions). From 17/02/2005 till 03/03/2005 (first HCBS measurement campaign) and from 14/03/2006 until 5/04/2006 (second HCBS measurement campaign) the frame was placed nearby the CDW. From 24/05/2005 until 8/06/2005 the frame was placed in the vicinity of the sill of Deurganckdok. Only a comparison between the measurements from the 14th of March until the 5th of April 2006 will be given here. For a comparison between the two deployments nearby the CDW for the HCBS measurements, there can be referred to IMDC (2006k). Concerning the HCBS measurements that took place at height of the sill only very few data is available, due to collapsing of the frame on its side (IMDC2005h).

Comparing the average concentration per tidal phase in layers of 10 cm measured by the ARGUS, for a period of comparable tidal amplitudes (24/03/2006 – 5/04/2006 & 22/04/2006 – 05/05/2006), there can be seen that tidal changes are similar (larger value near high water than near low water). Further generally higher concentrations were measured during the HCBS2 measurements. Also during both measurements the highest suspended sediment concentrations were measured close to spring tide. Figure 5-6 gives a comparison of the ARGUS sensors 67 to 76 (sensor 1 = uppermost sensor). Notice that during both measurements the ARGUS was mounted to the frame at exactly the same height.

Bottom variations for a period of comparable tidal amplitudes are very alike for both measurements. Average echosounder – bottom distances also are quasi the same (Figure 5-7). During both measurements the Altus was mounted to the frame at the same height.

When comparing average suspended sediment concentrations measured 1 m above the bed (RCM9), during a period of comparable tidal amplitudes, the same pattern as the one of the ARGUS can be seen (Figure 5-8). Tidal changes are similar, concentrations are higher for the

HCBS2 measurements and the highest concentrations can be found close to spring tide. Average velocities 1m above the bed are slightly smaller during this measurement campaign (Figure 5-9).

During the period of comparable tidal amplitudes (24/03/2006 – 5/04/2006 & 22/04/2006 – 05/05/2006), the Valeport MIDAS ran short of battery.

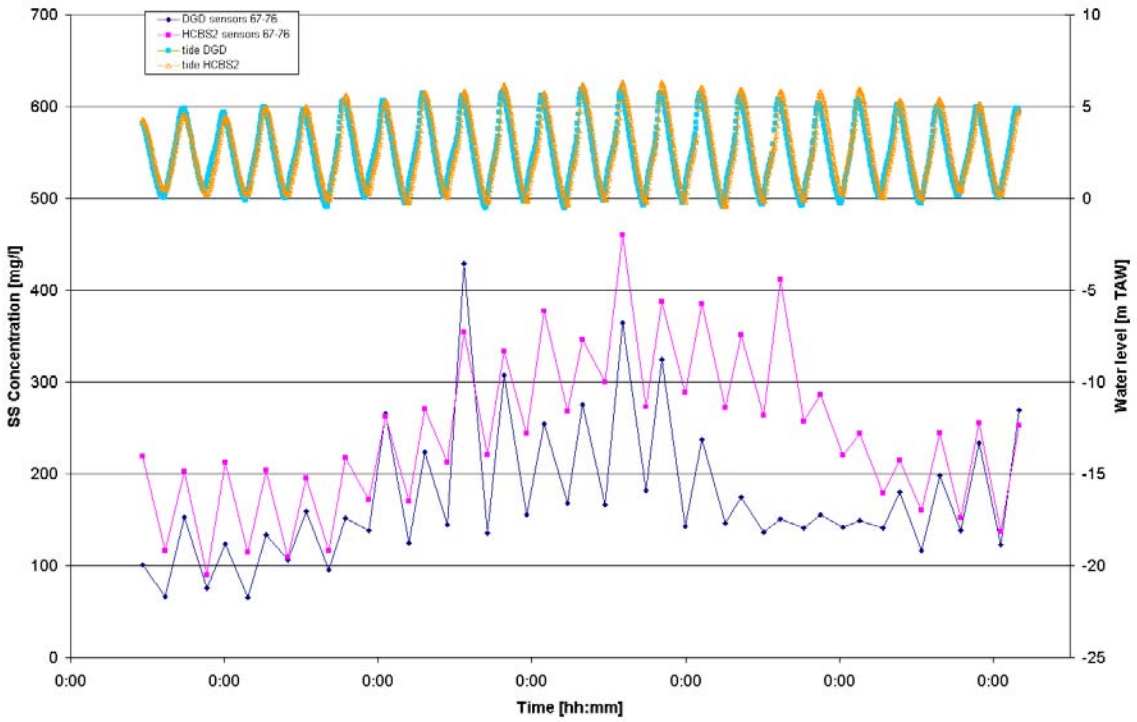

Figure 5-6: Average concentration per tidal phase for ARGUS sensors 67-76 (DGD vs. HCBS2)

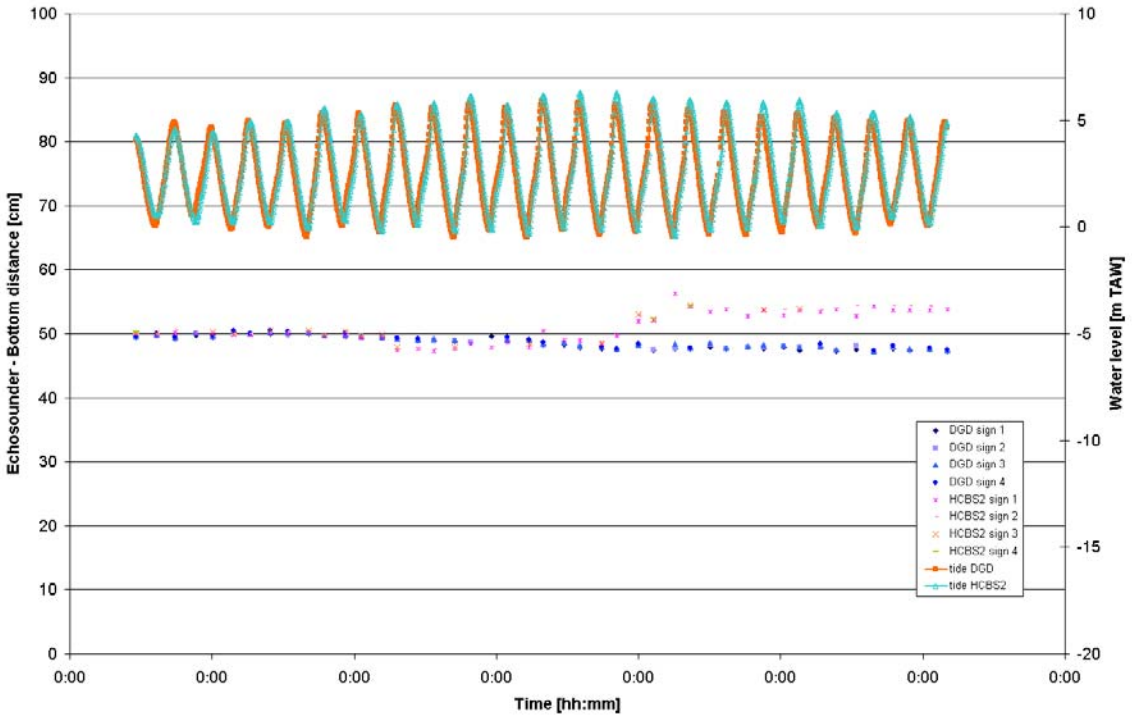

Figure 5-7: Echosounder - bottom variation for each HW/LW (DGD vs. HCBS2)

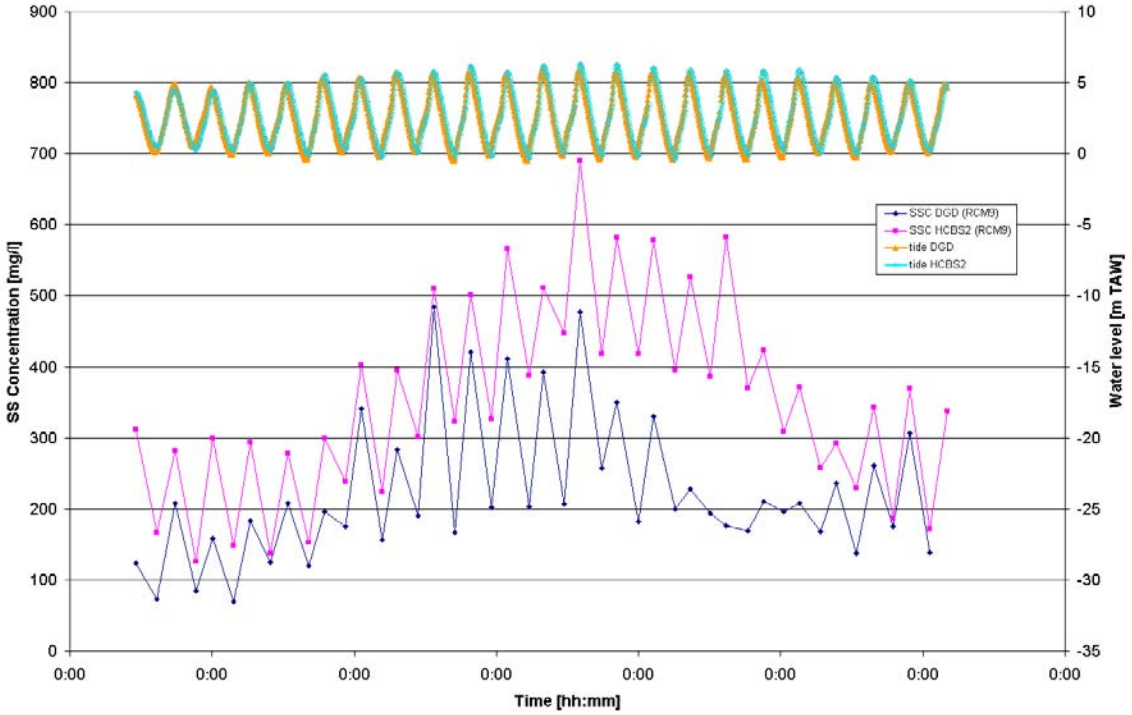

Figure 5-8: Average concentration per tidal phase 1.0m above the bed (DGD vs. HCBS2)

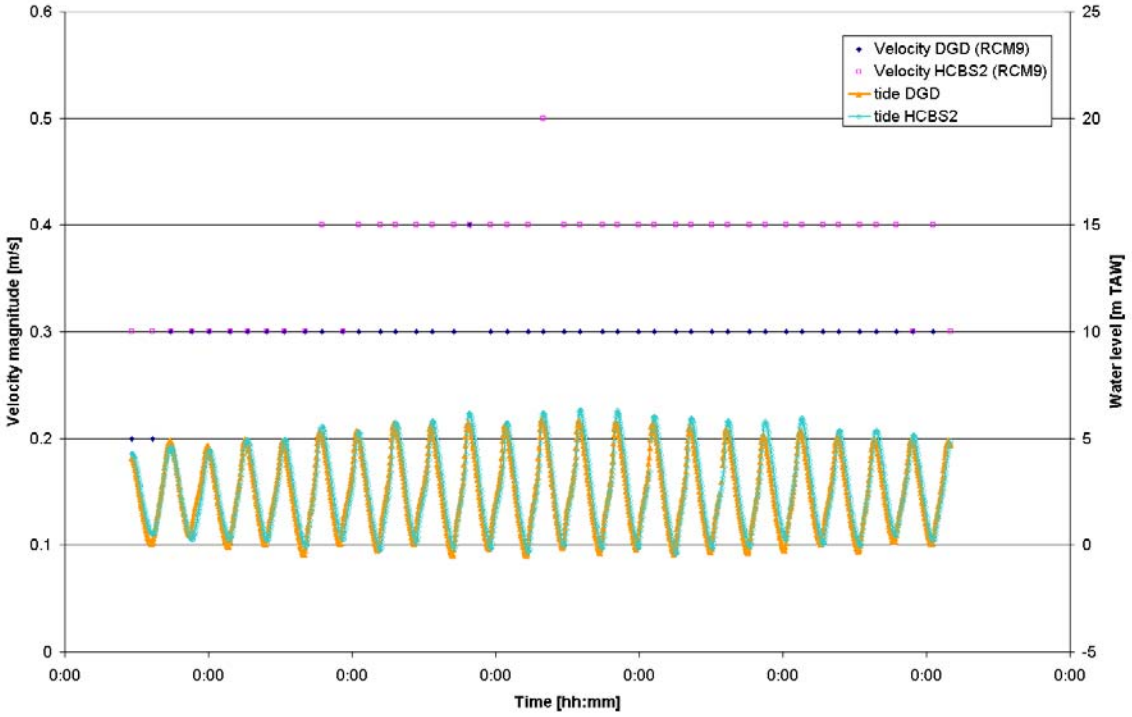

Figure 5-9: Average velocity magnitude per tidal phase (DGD vs. HCBS2)

6. REFERENCES

ARGUS UMWELT-MEATECHNIK (2005), ASM-IV-laser, ARGUS surface meter manual, 31p.

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IMDC (2005d). Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 2.3: Liefkenshoek 17/02/2005, I/RA/11265/05.0011/MSA.

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IMDC (2006e) Uitbreiding studie densiteitsstromingen in de Beneden Zeeschelde in het kader van LTV Meetcampagne naar hooggeconcentreerde slibsuspensies Deelrapport 7.4 23 March 2006 Parel 2 – Schelle (I/RA/11291/06.097/MSA).

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IMDC(2006h) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.1 Opmeting stroming en zout- en sedimentbeweging aan de ingang van het Deurganckdok (SiltProfiler) (I/RA/11283/06.087/WGO).

IMDC(2006i) Langdurige metingen Deurganckdok: Opvolging en analyse aanslibbing. Deelrapport 2.3. Opmeting stroming en zout-en sedimentbeweging aan de ingang van het Deurganckdok (ADCP) (I/RA/11283/06.110/BDC)

IMDC(2006j): Studie van de stromingsvelden en sedimentuitwisseling aan de ingang van Deurganckdok. Current and Sediment flux measurements November 17th 2005 (I/RA/15030/06.021/BDC).

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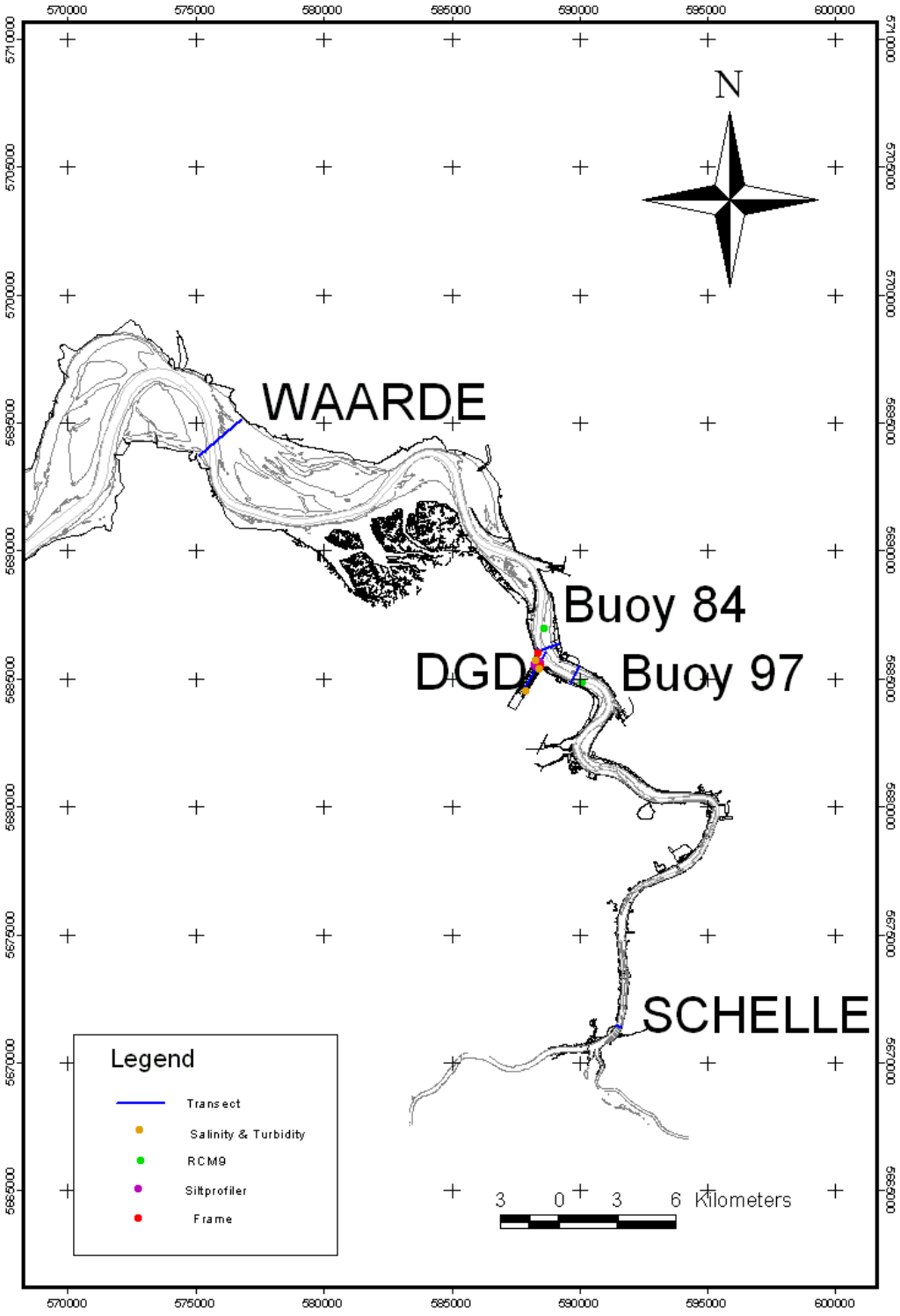
APPENDIX A.

OVERVIEW OF MEASUREMENTS

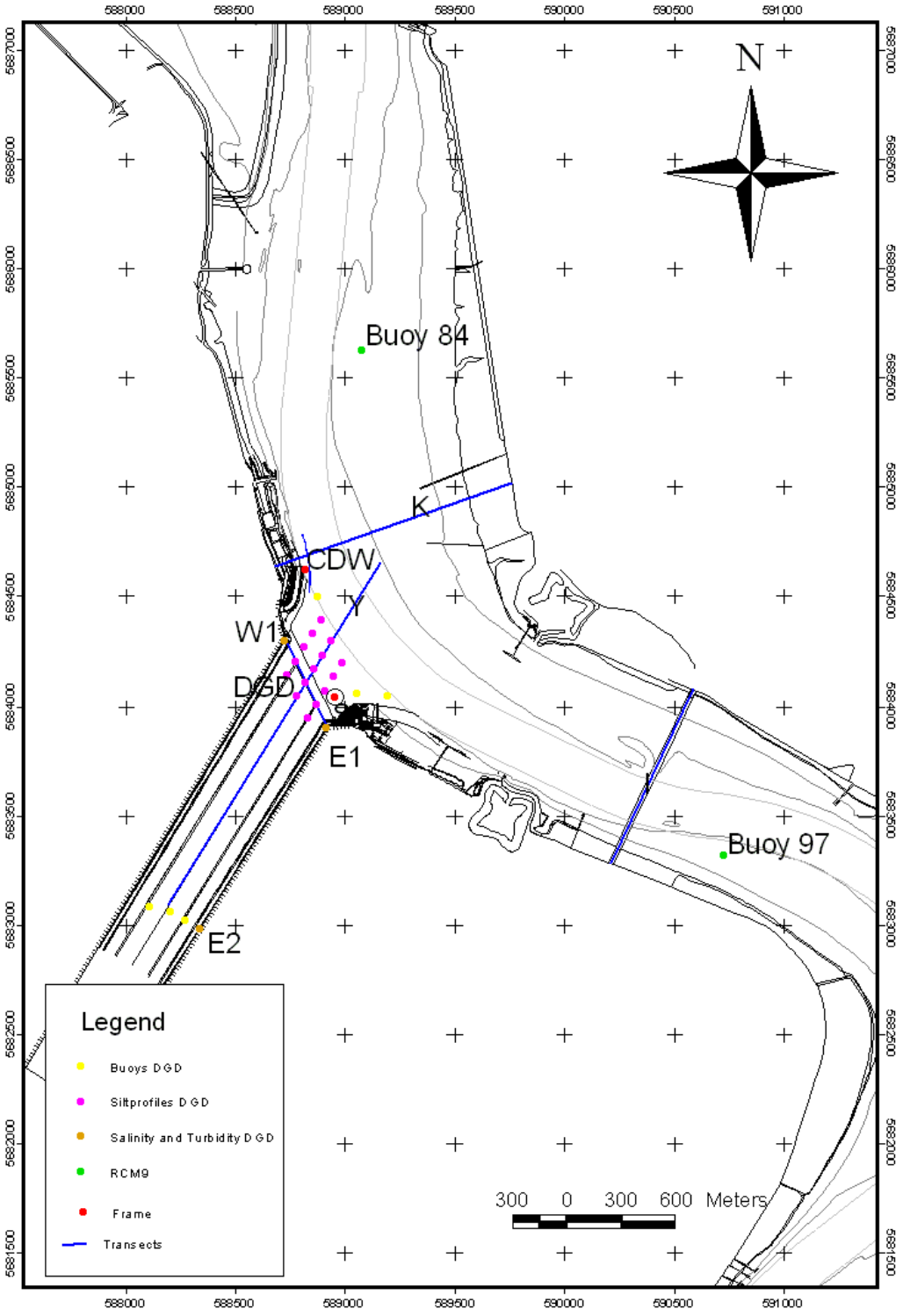
A.1 Overview of the measurement locations for the whole HCBS measurement campaign

Through tide measurements: Transects					
Location	*Easting (UTM ED 50)*		*Northing (UTM ED 50)*		*Period*
Deurganckdok (in dock)	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect Y)	*589059*	591298	*5684948*	*5683077*	21/03/2006
Liefkenshoek	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect I)	590318	590771	5684257	5683302	22/03/2006
Deurganckdok (downstream)	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect K)	588484	589775	5684924	5685384	22 & 23/03/2006
Deurganckdok (in dock)	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect DGD)	588765	588541	5684056	5684527	22/03/2006
Schelle	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect S)	592645	592953	5665794	5665682	23/03/2006
Waarde	*Left Bank*	*Right Bank*	*Left Bank*	*Right Bank*	
(transect W)	573541	571318	5696848	5694933	23/03/2006
Through tide measurements: Siltprofiler gauging points					
Location	*Easting (UTM ED 50)*		*Northing (UTM ED 50)*		*Period*
Location 1: Xa	588549		5684335		21/03/2006
Location 2: Xb	588596		5684411		
Location 3: Xc	588643		5684486		
Location 4: Xd	588690		5684562		
Location 5: Xe	588737		5684638		
Location 6: Ya	588606		5684217		
Location 7: Yb	588653		5684293		
Location 8: Yc	588700		5684368		

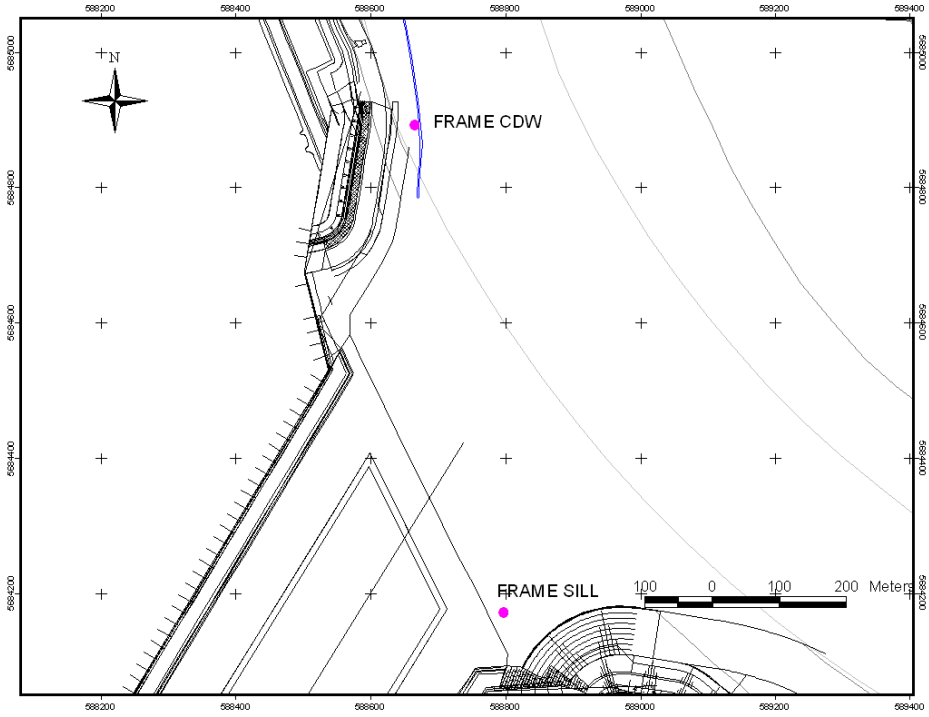
Through tide measurements: Siltprofiler gauging points			
Location	*Easting (UTM ED 50)*	*Northing (UTM ED 50)*	*Period*
Location 9: Yd	588747	5684444	21/03/2006
Location 10: Ye	588793	5684520	
Location 11: Za	588662	5684099	
Location 12: Zb	588709	5684174	
Location 13: Zc	588756	5684250	
Location 14: Zd	588803	5684326	
Location 15: Ze	588850	5684402	
Near bed continuous monitoring			
Location	*Easting (UTM ED 50)*	*Northing (UTM ED 50)*	*Period*
Deurganckdok CDW	588653	5684906	14/03/2006 – 05/04/2006
Settling velocity – INSSEV			
Location	*Easting (UTM ED 50)*	*Northing (UTM ED 50)*	*Period*
Deurganckdok CDW	588717	5684898	05/09/2006
Deurganckdok SILL	588800	5684250	06/09/2006
Deurganckdok Western quay wall	588452	5684355	07/09/2006



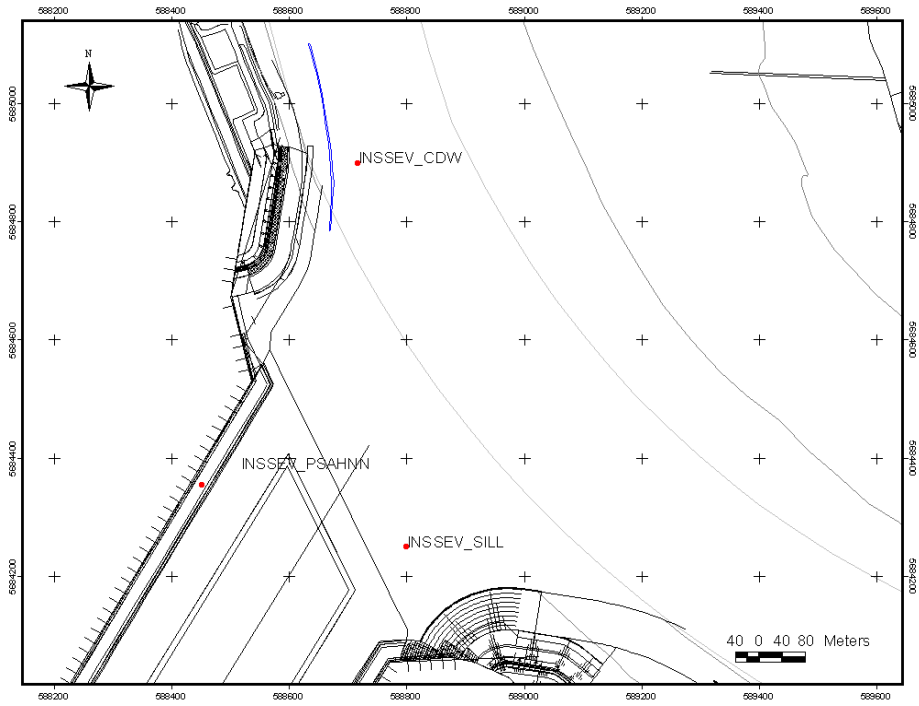
Overview of the measurement locations
21/03/2006 – 23/03/2006



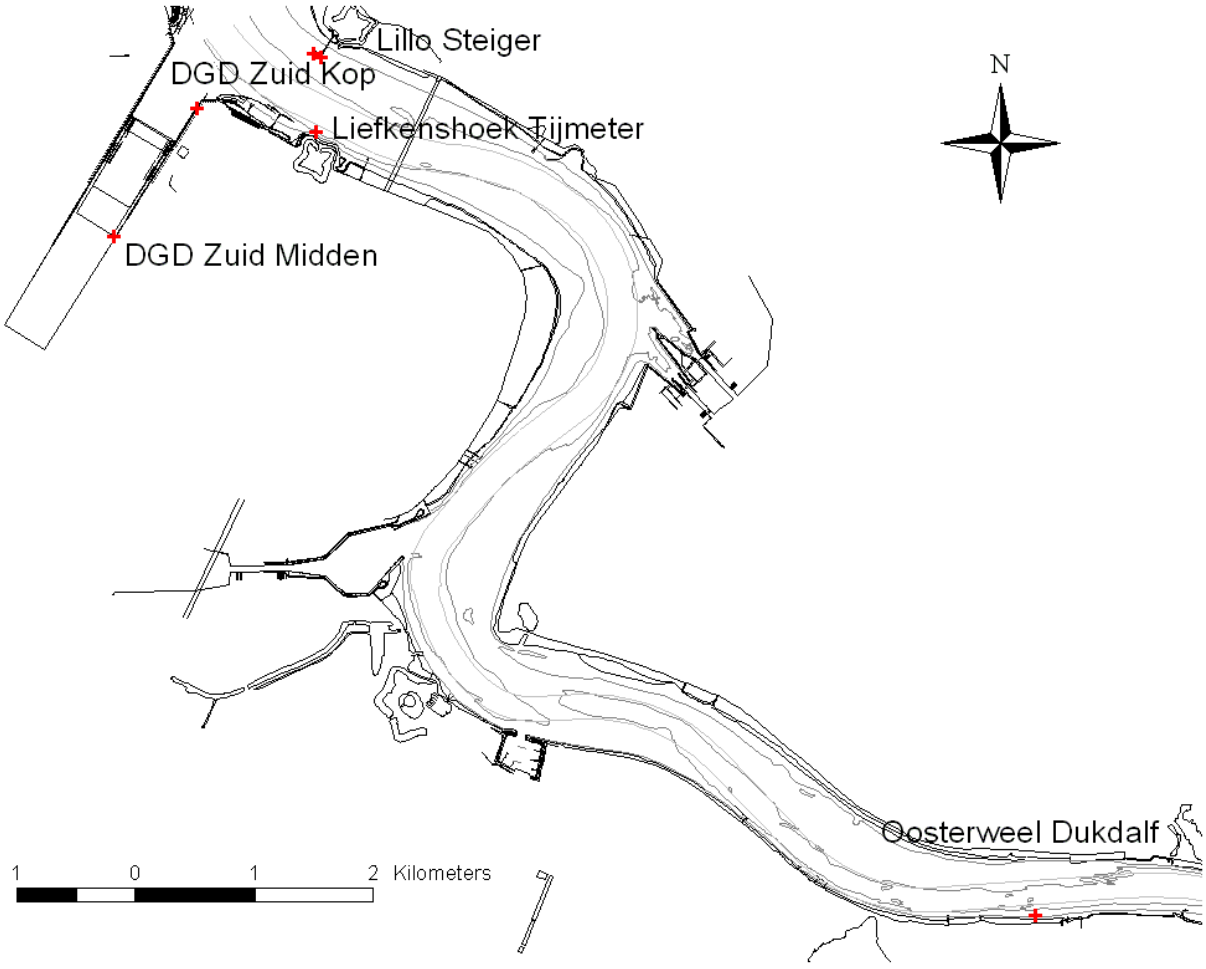
Overview of the measurement locations in Deurganckdok
21/03/2006 – 23/03/2006



Near bed continuous monitoring
14/03/2006 – 05/04/2006



Settling velocity (INSSEV) 05/09/2006 – 07/09/2006



Calibration measurements - 15/03/2006 & 14/04/2006

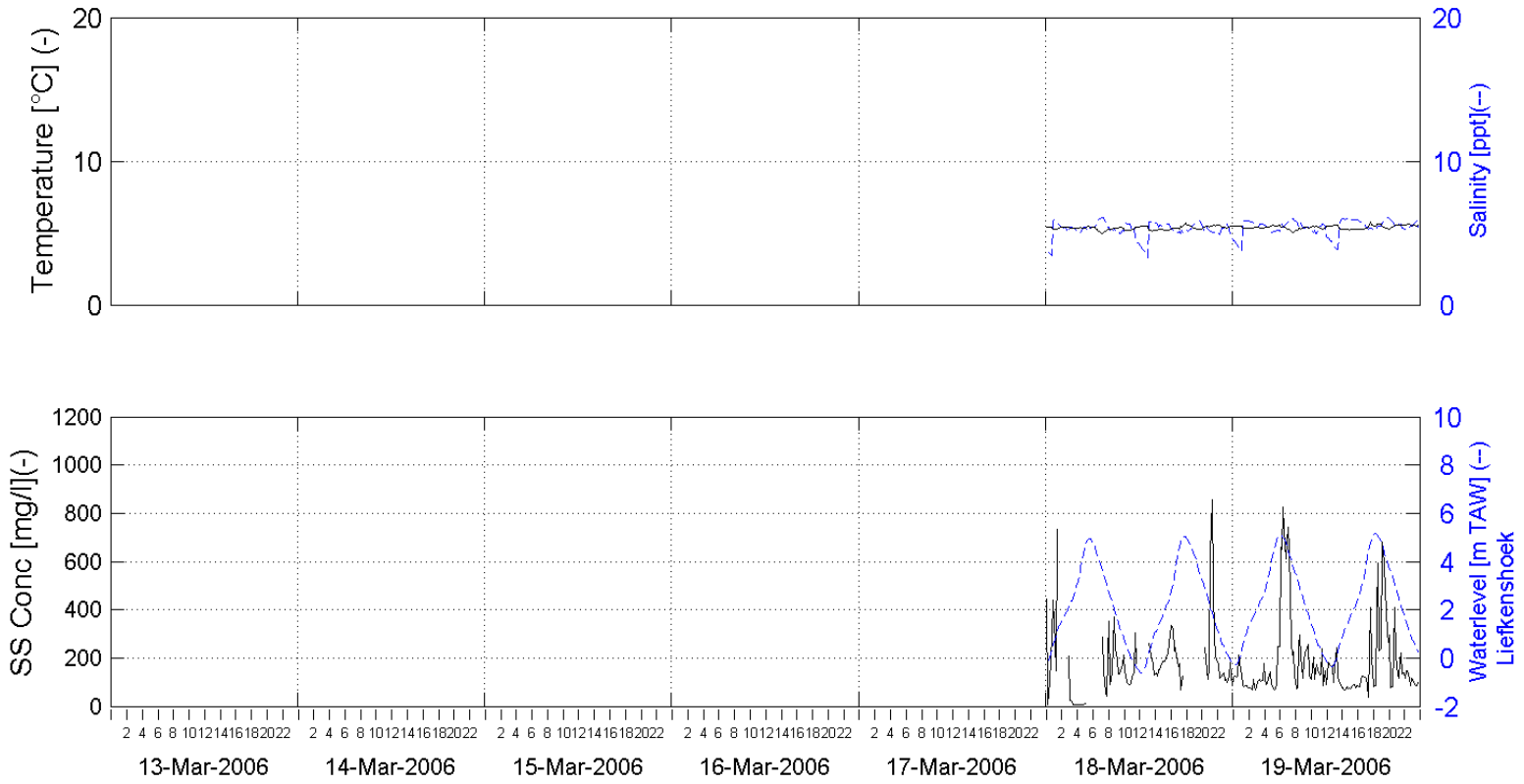
APPENDIX B. WEEKSERIES ZOUT- SLIB METINGEN

DGD

B.1 PSA (N-ENTRANCE)

11283 - Long-term monitoring DGD

Week 11 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

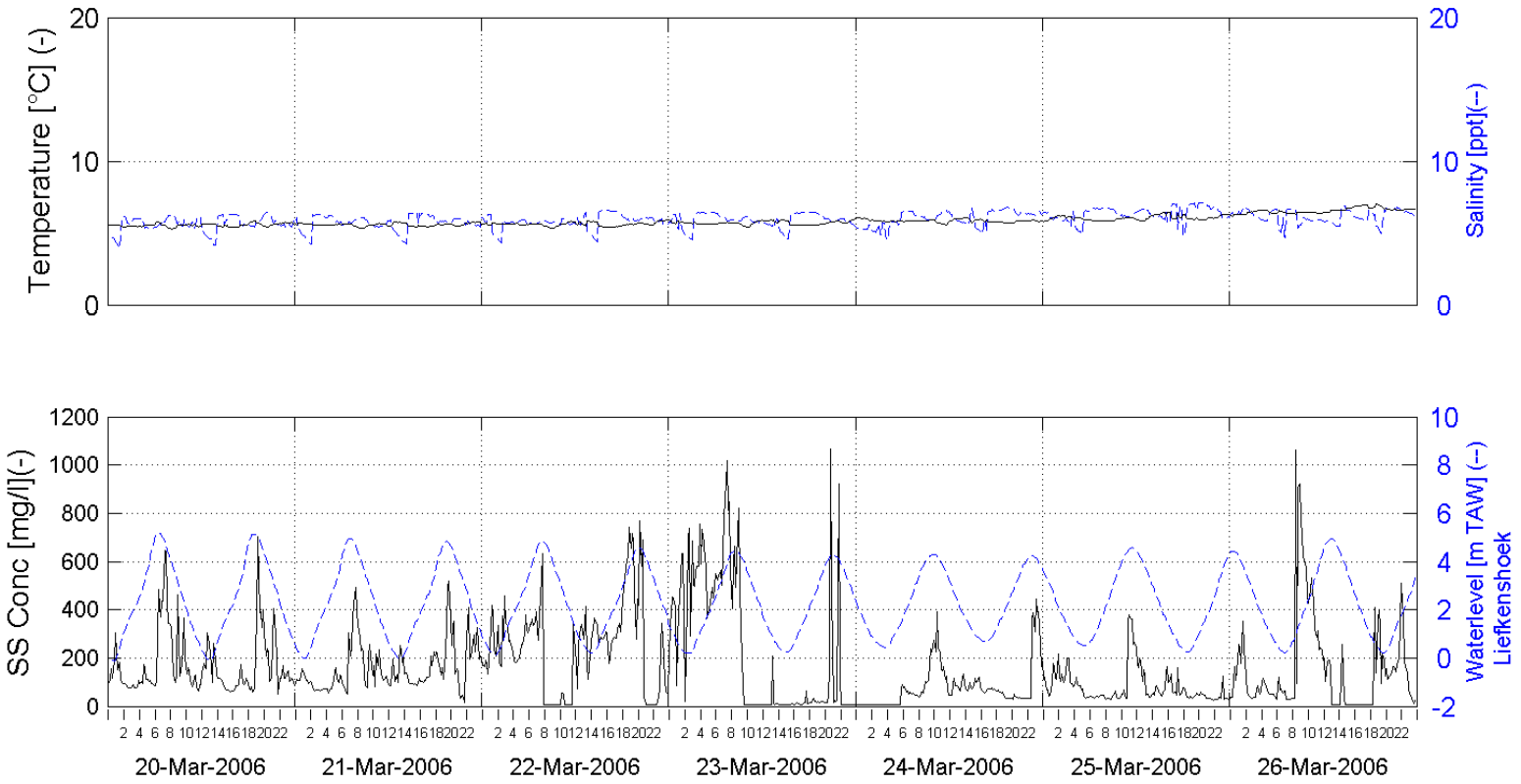
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

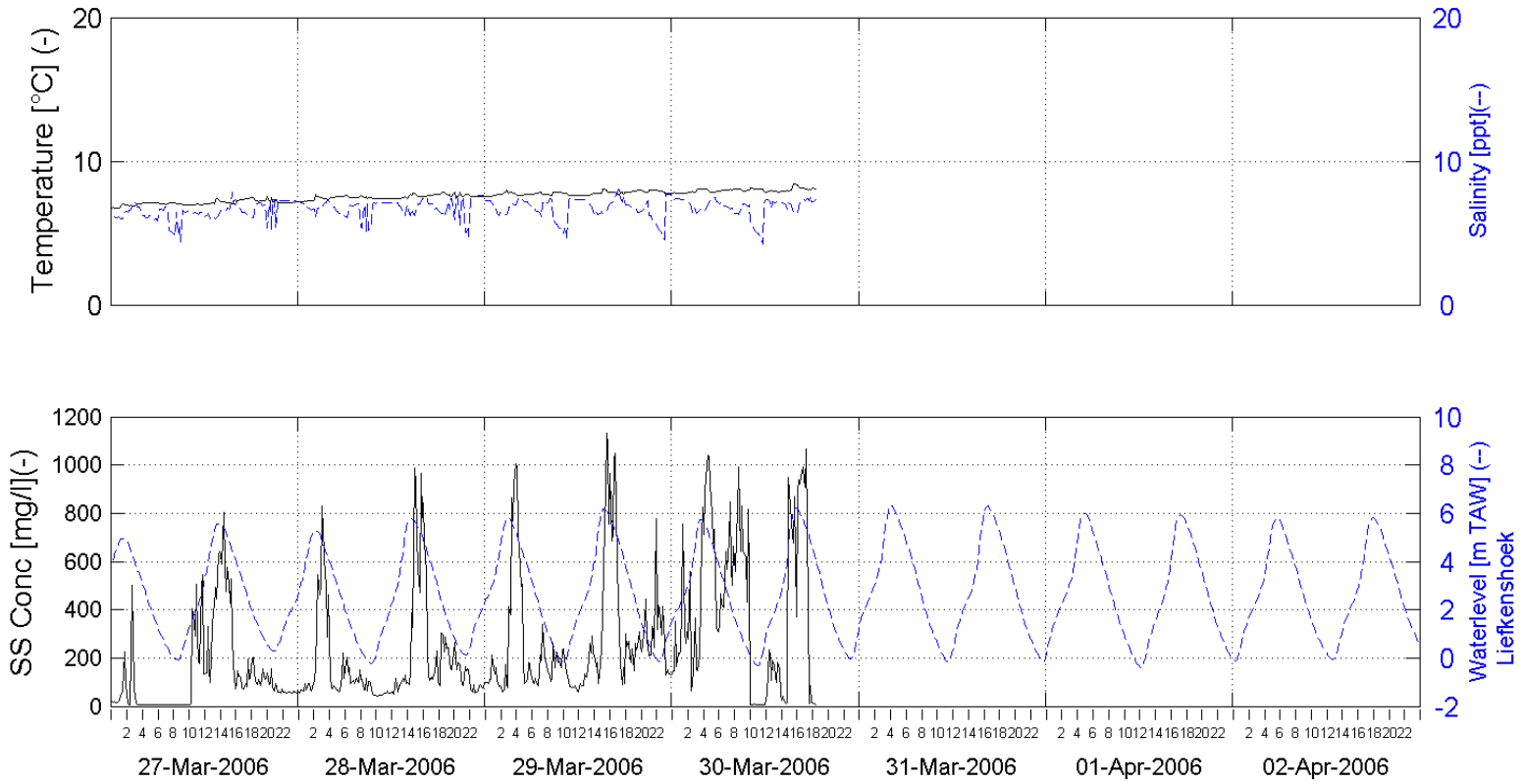
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

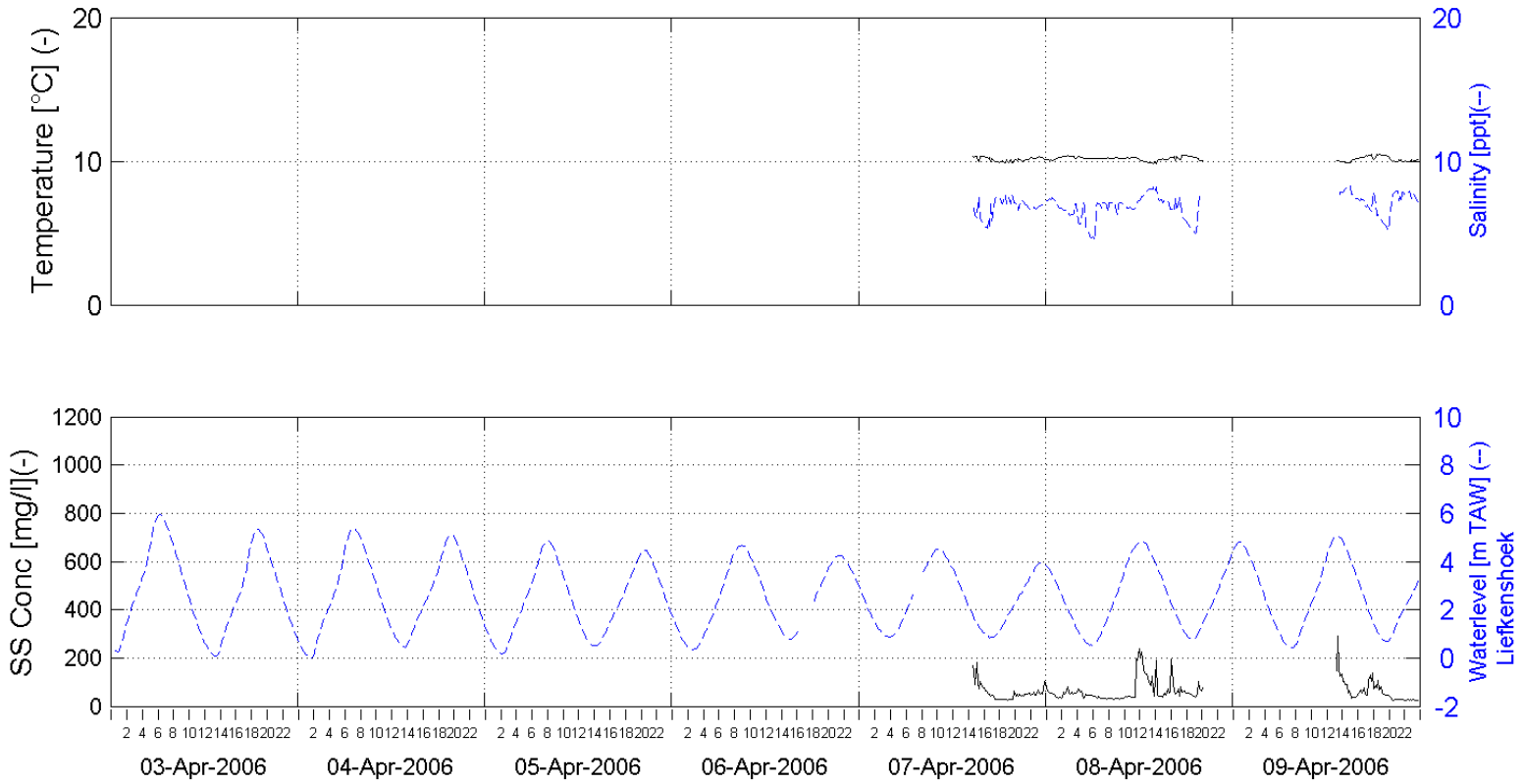
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

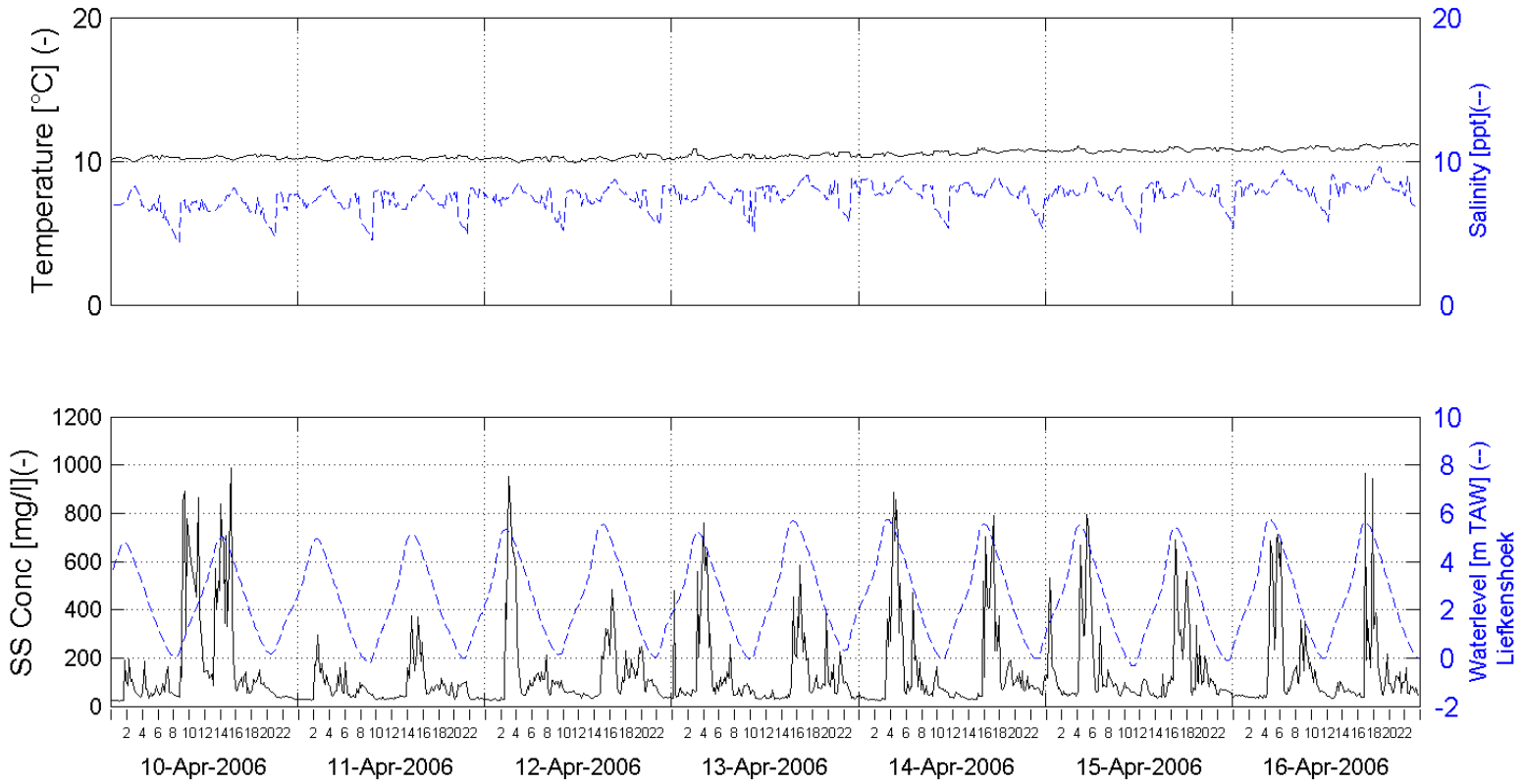
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

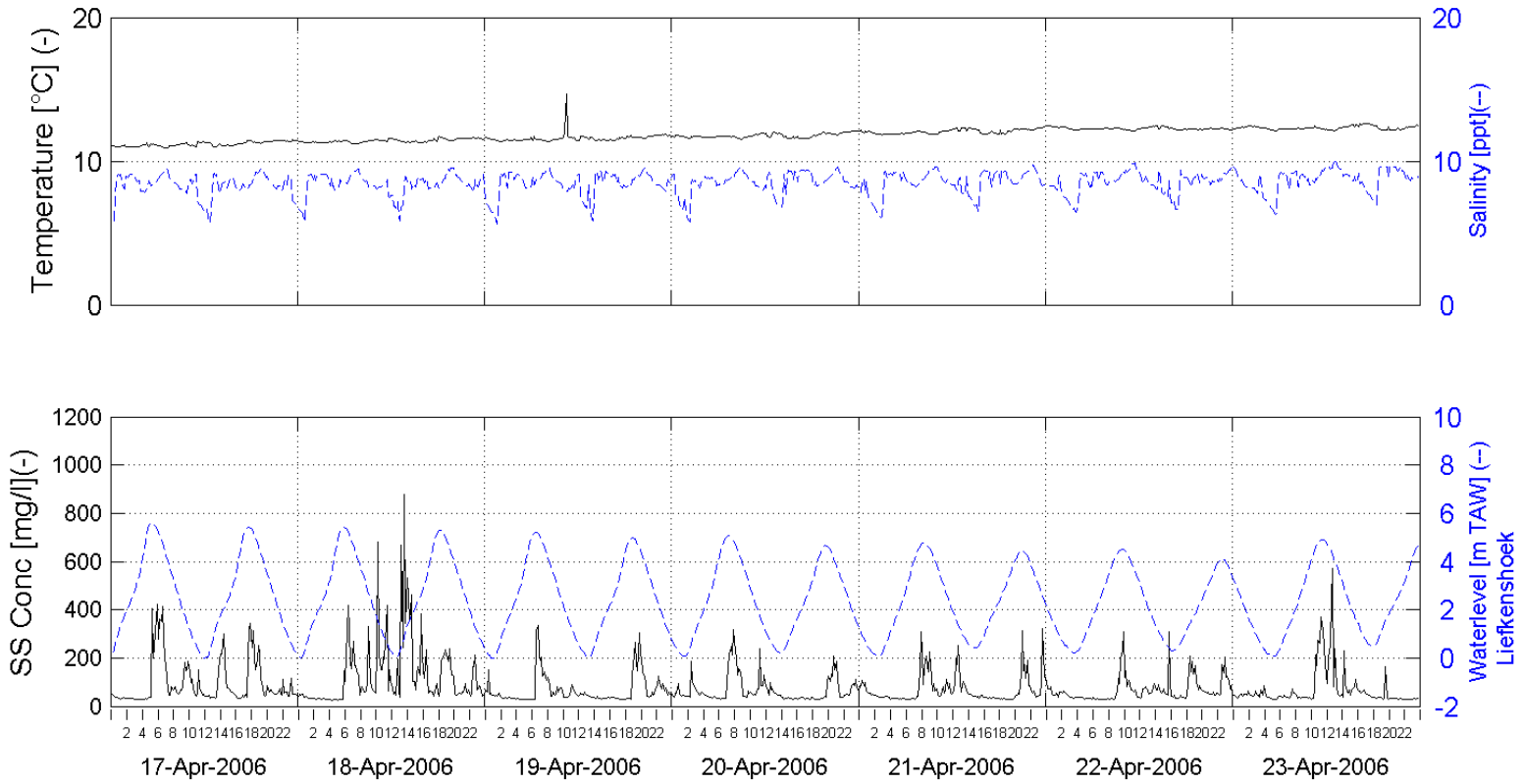
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

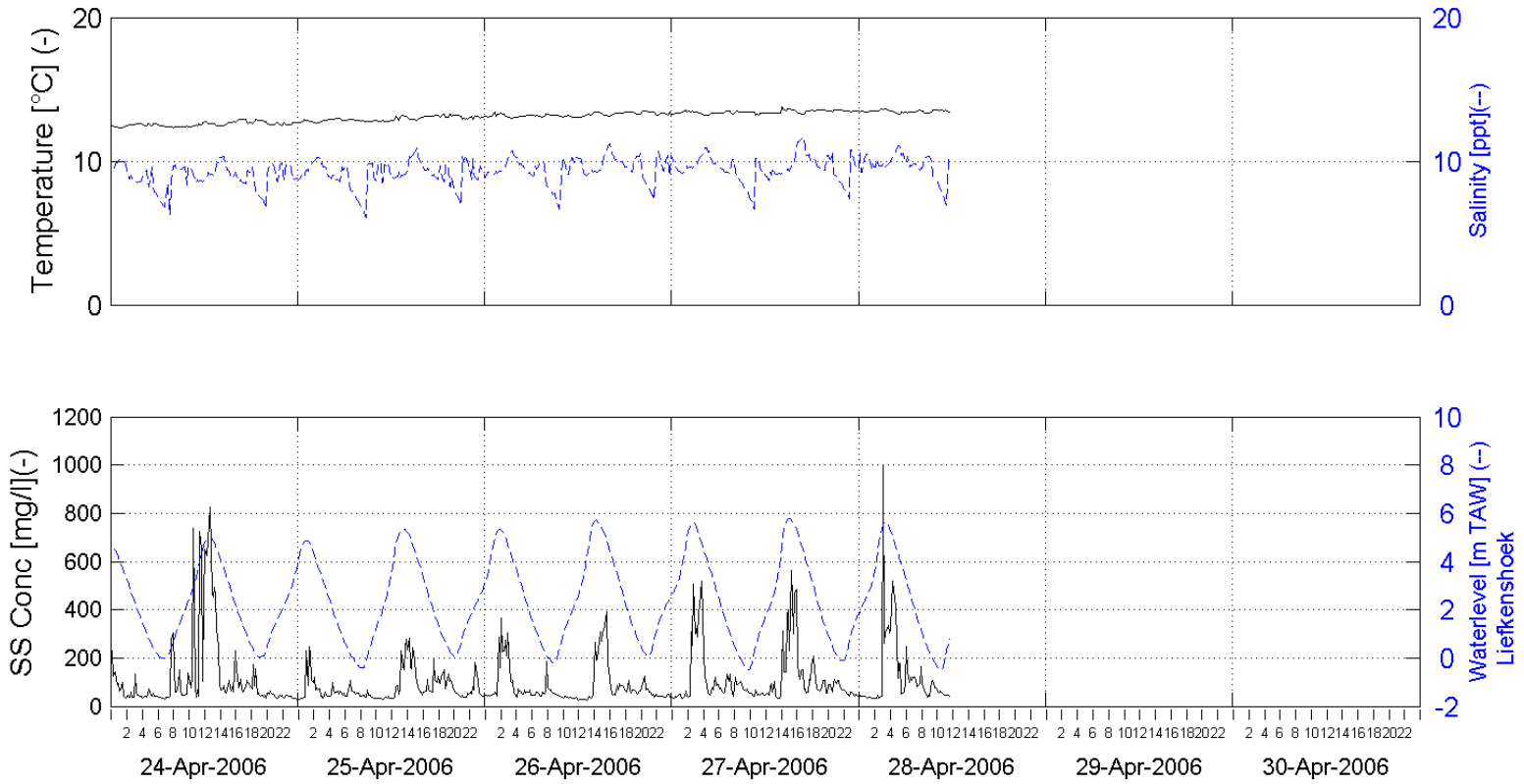
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

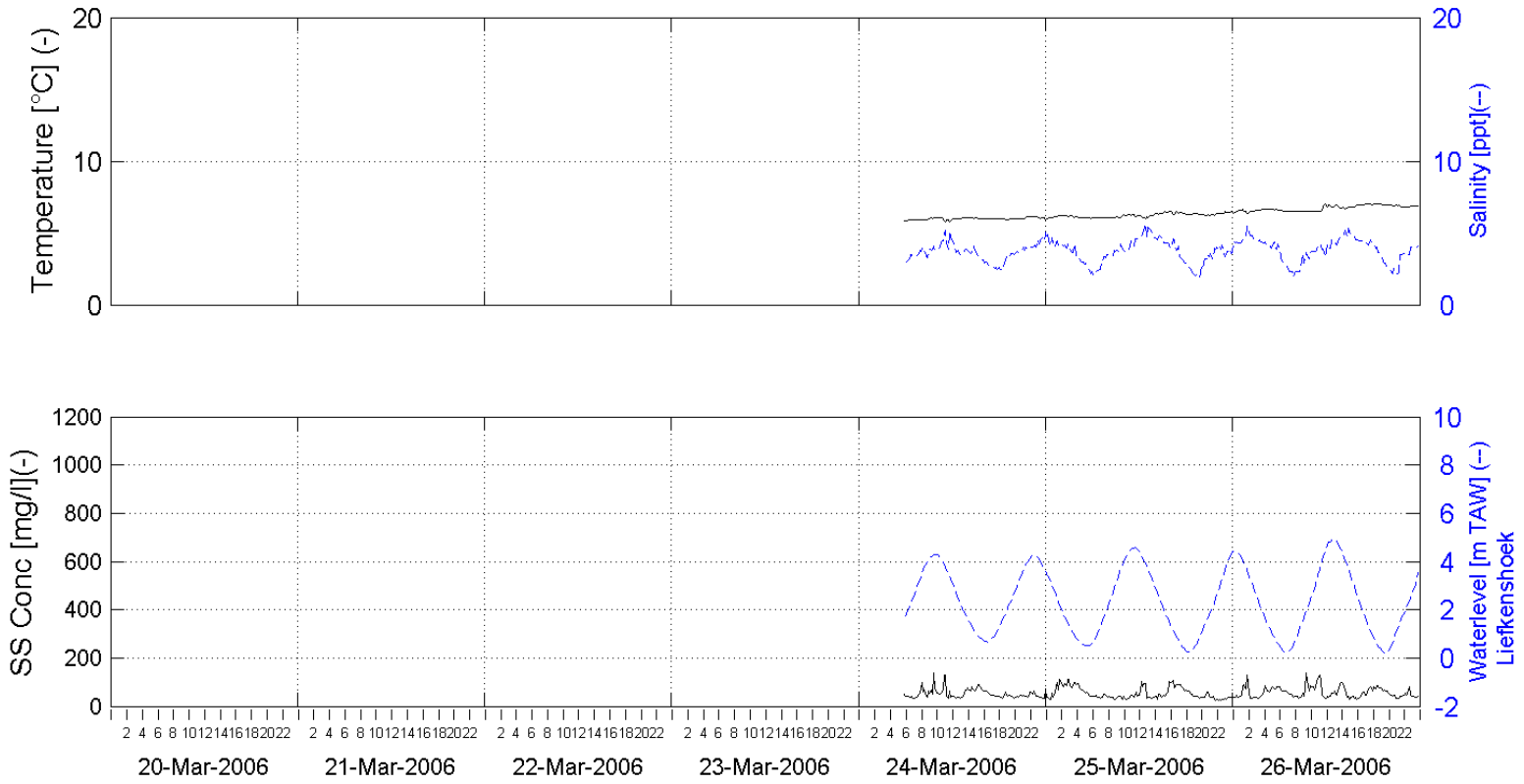
N-ENTRANCE 3m above bottom (-14m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

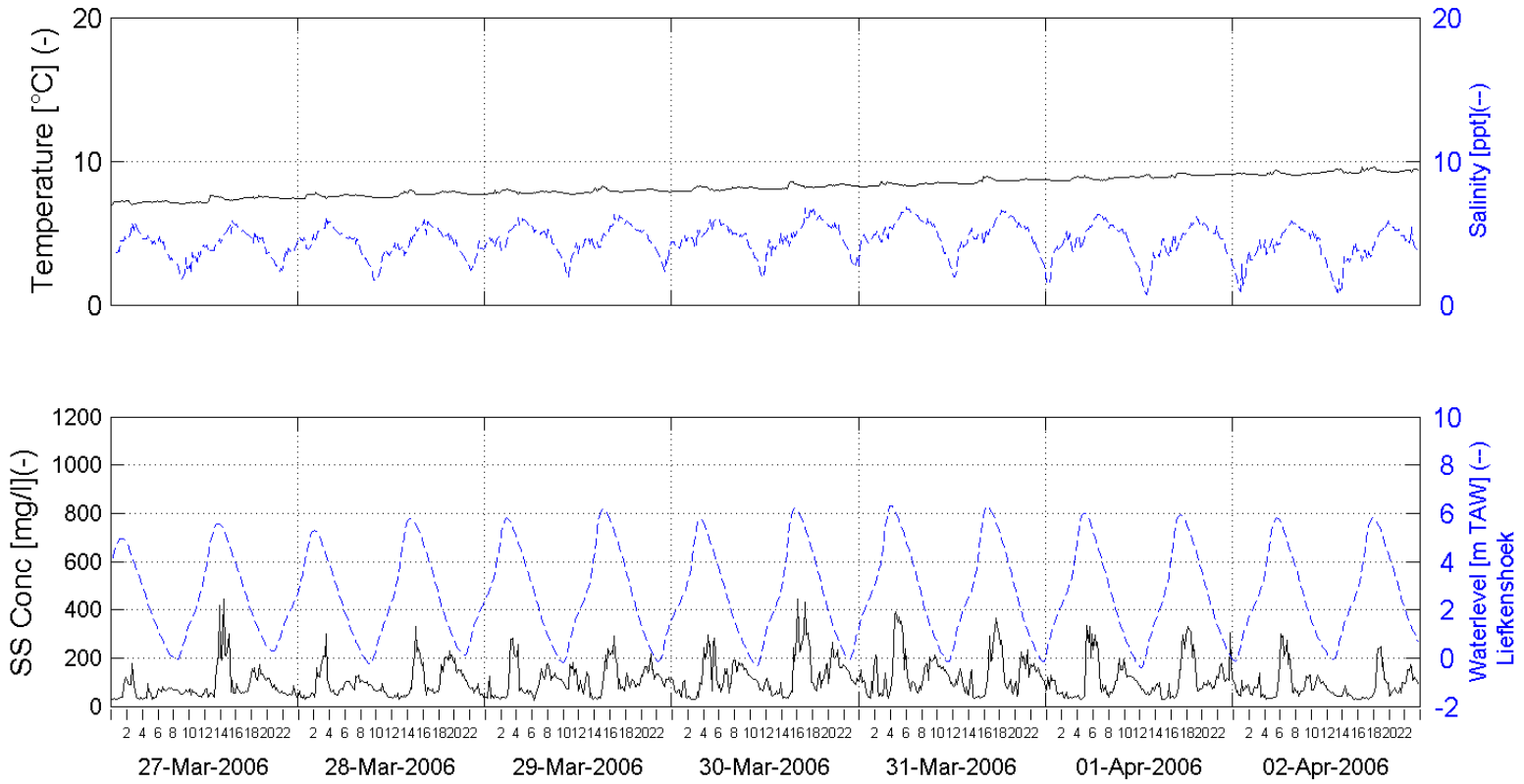
N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

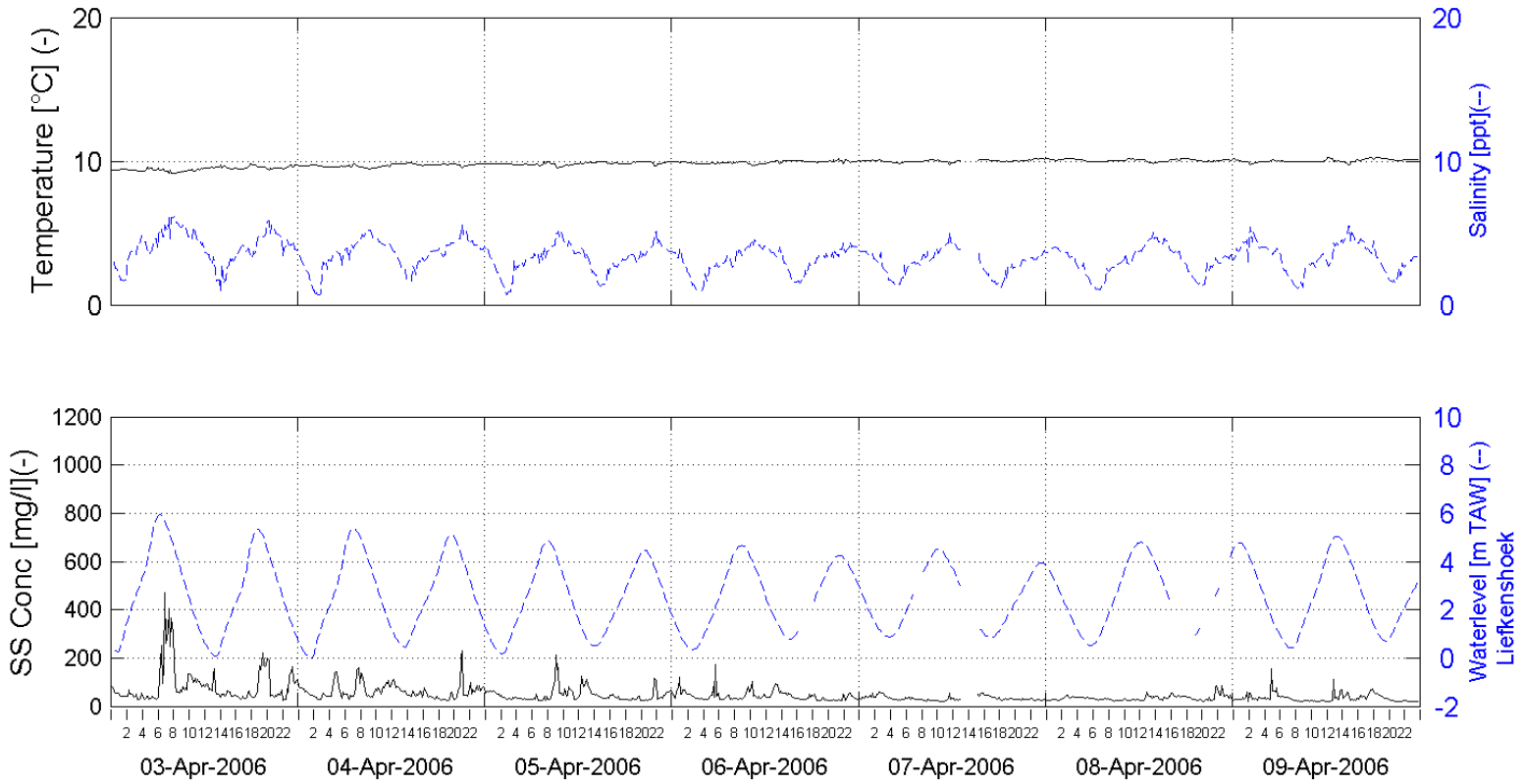
N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

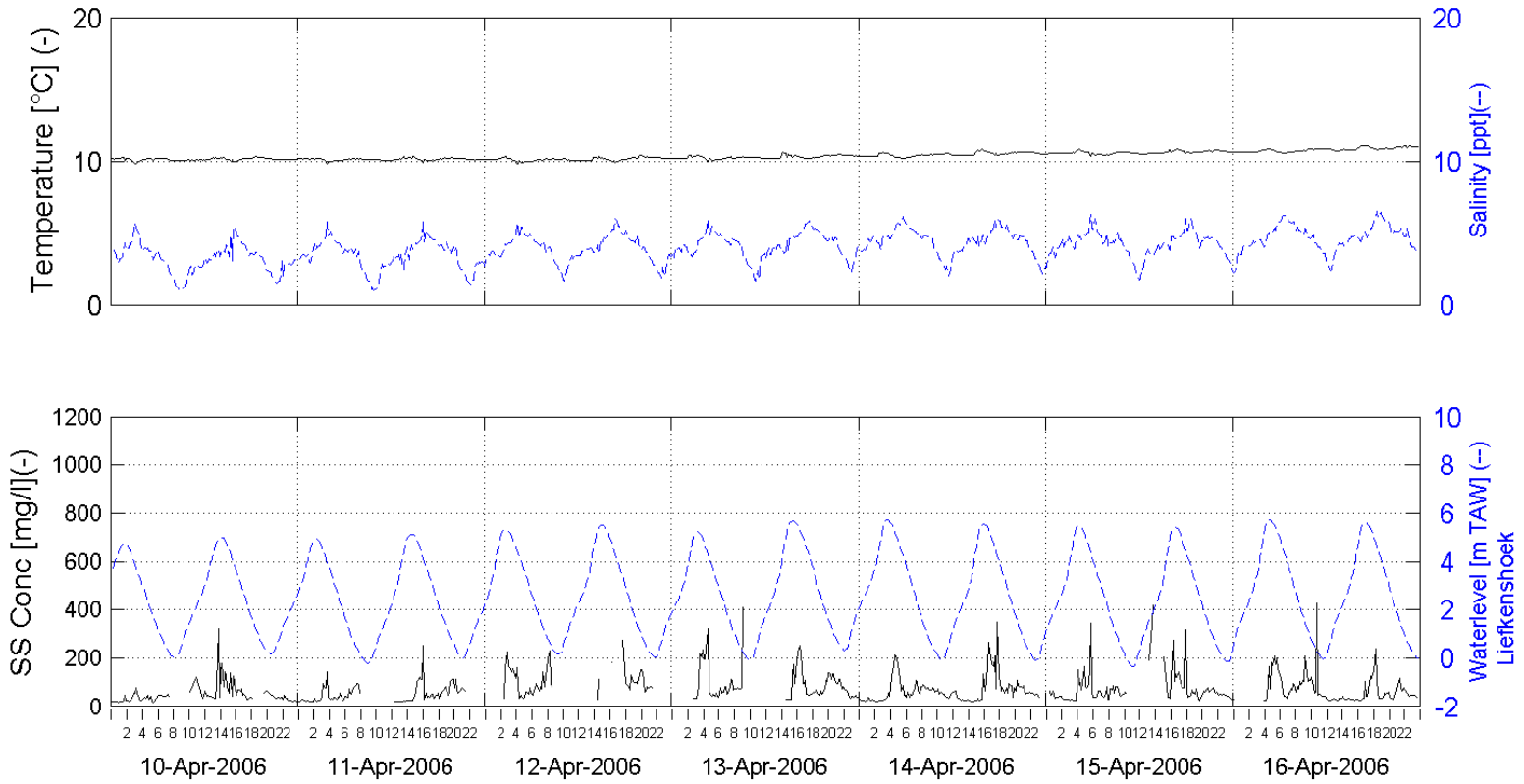
N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

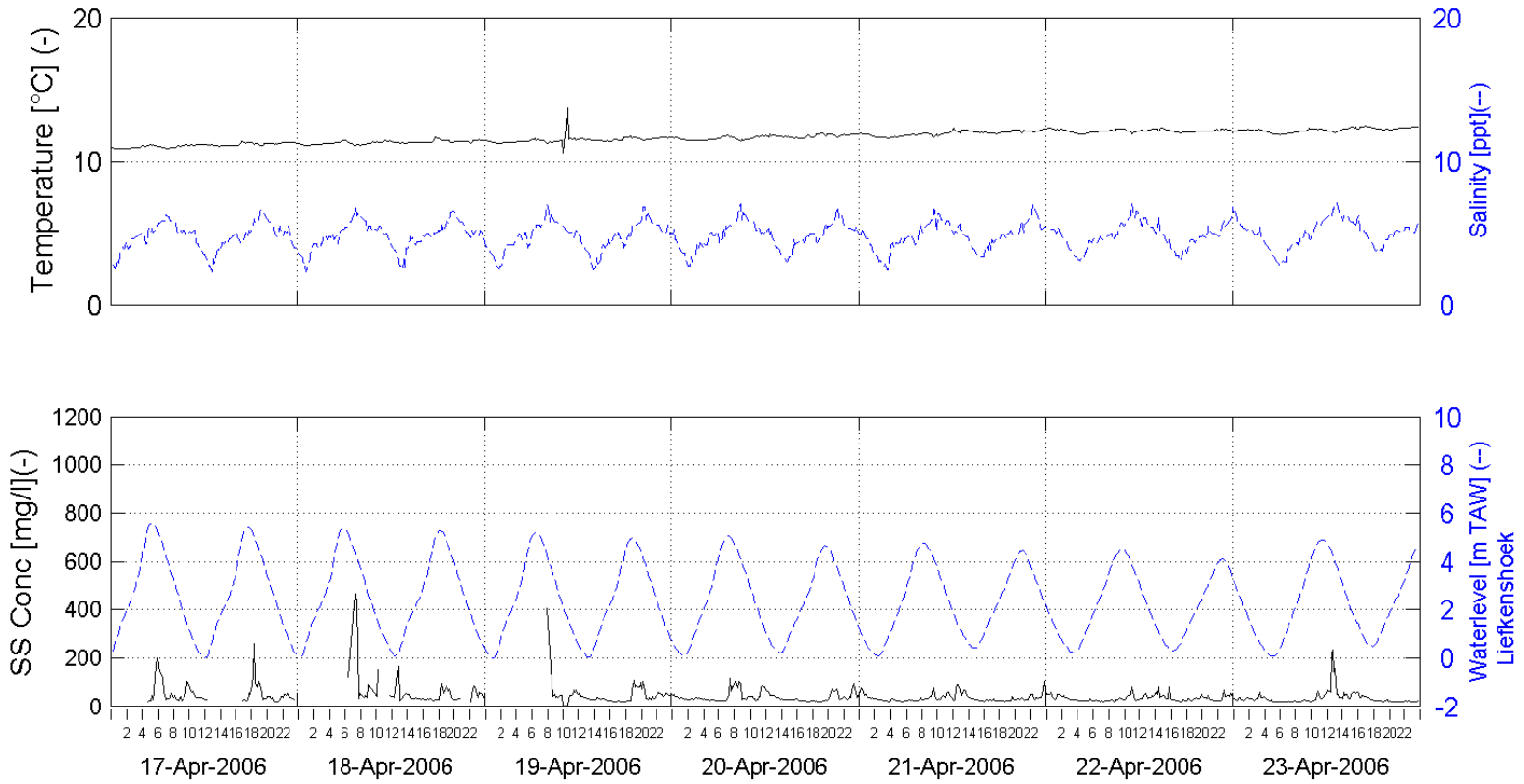
N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

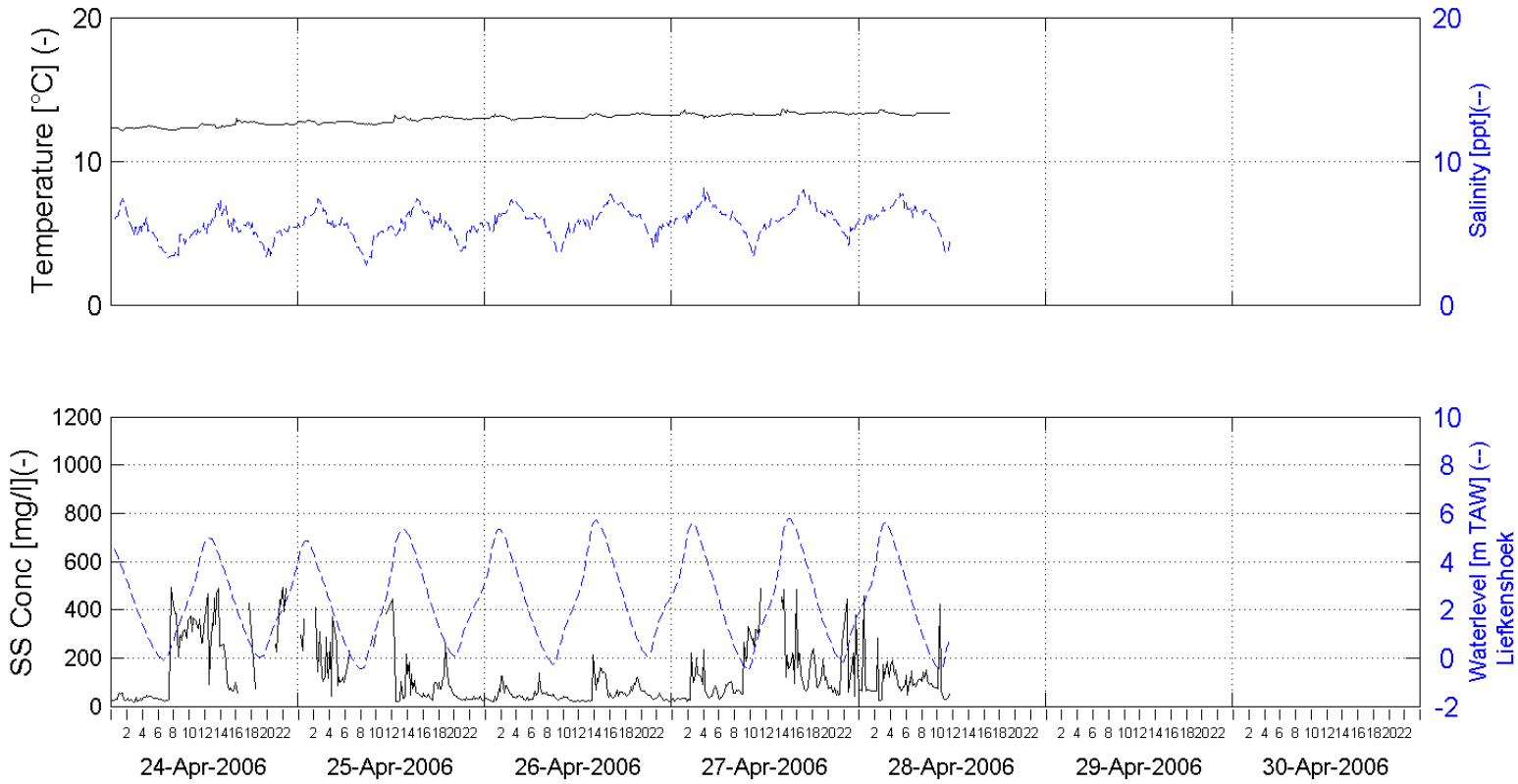
N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

N-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

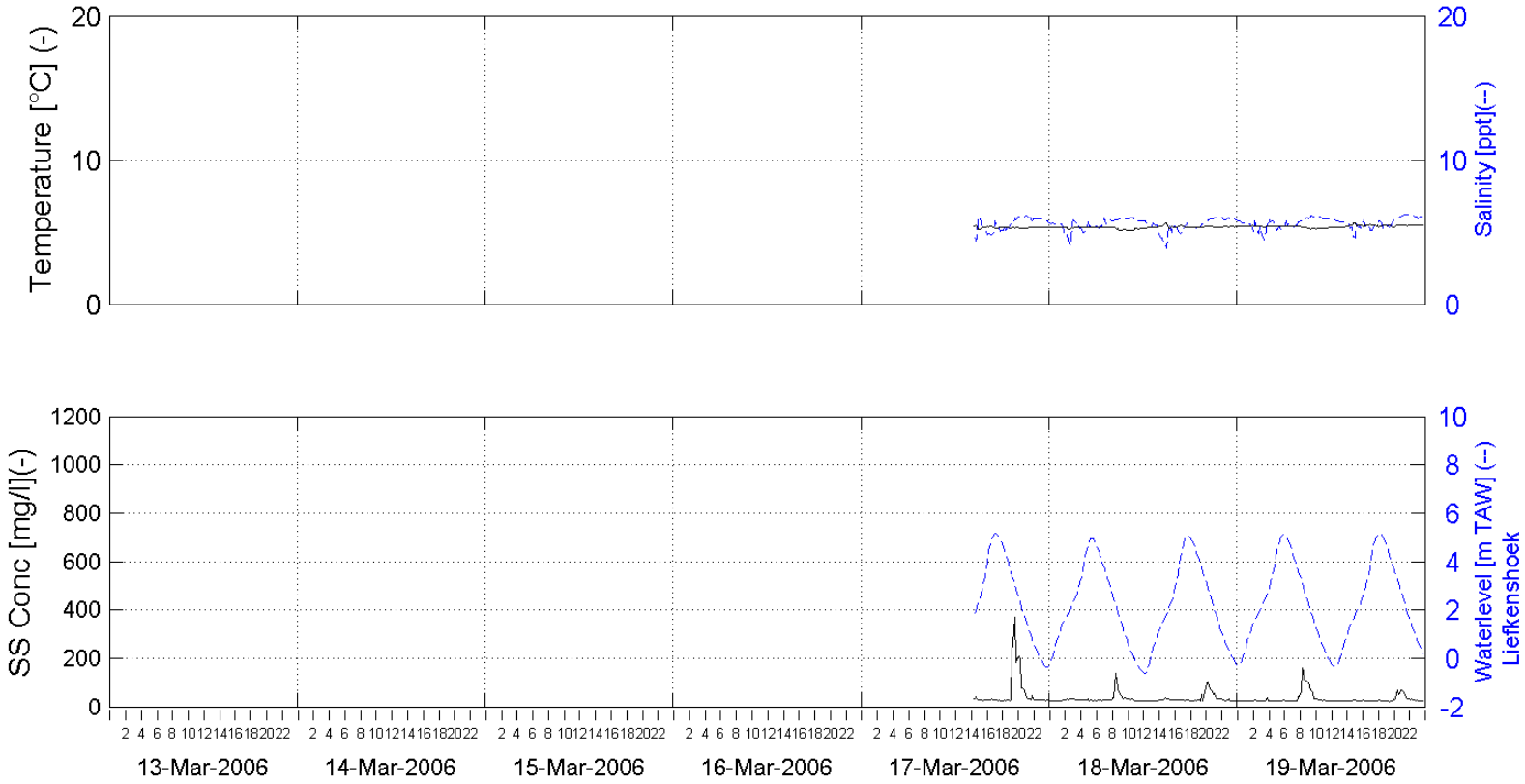
IMDC

In Association with:

B.2 P&O1 (S-BACK)

11283 - Long-term monitoring DGD

Week 11 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

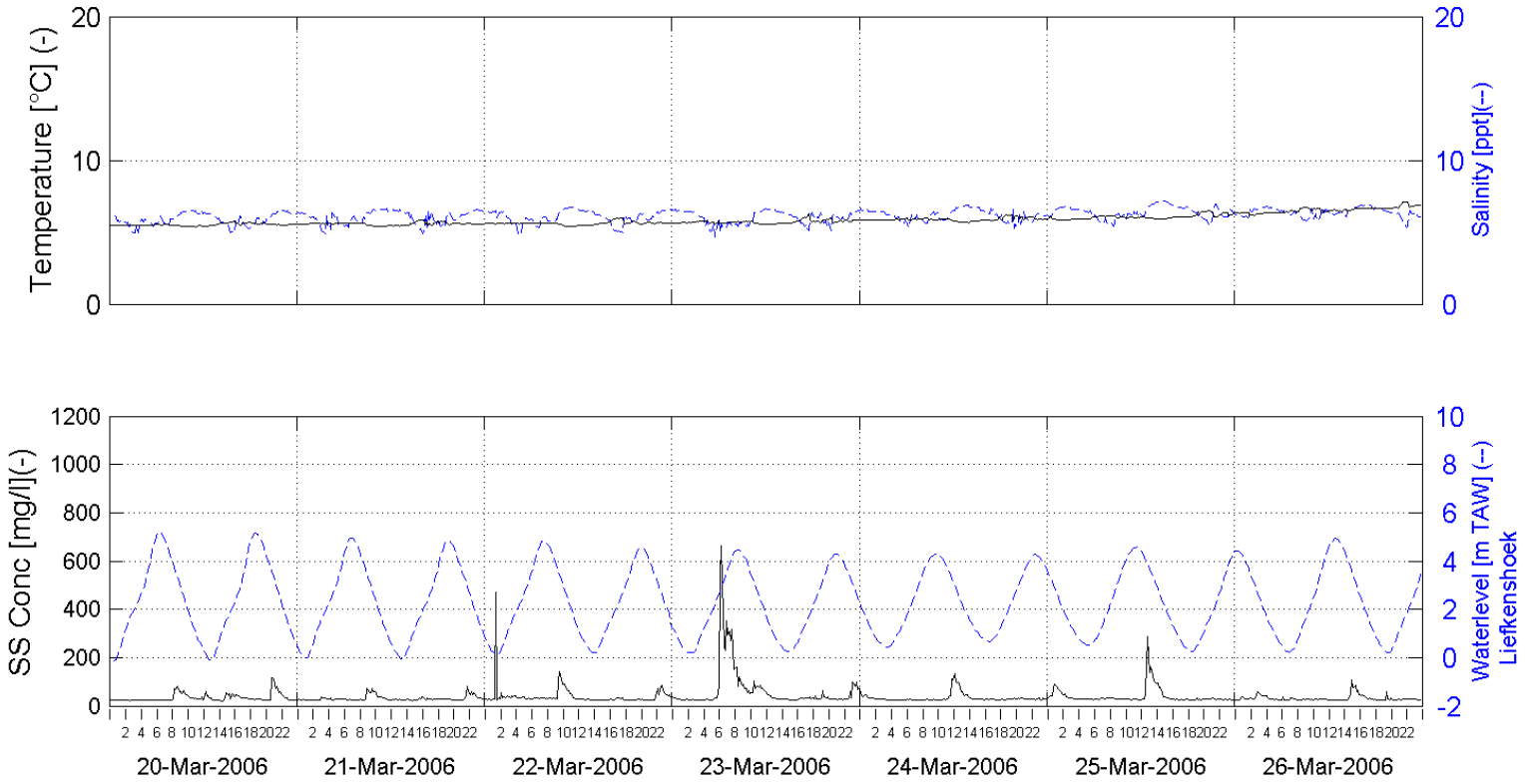
S-BACK 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Processed by:

IMDC

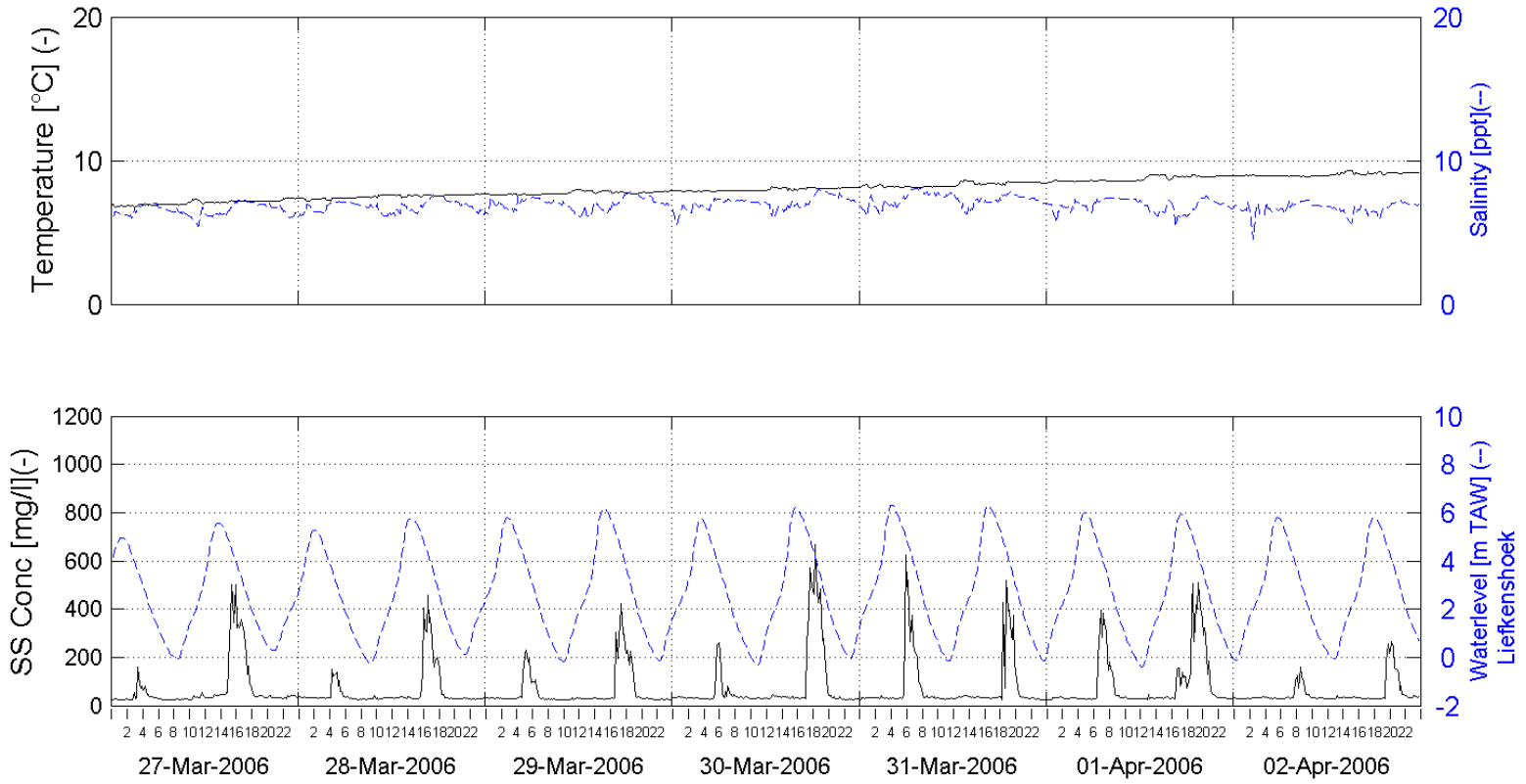
In Association with:

Location:

S-BACK 3.15m above bottom (-13.85m TAW)

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

S-BACK 3.15m above bottom (-13.85m TAW)

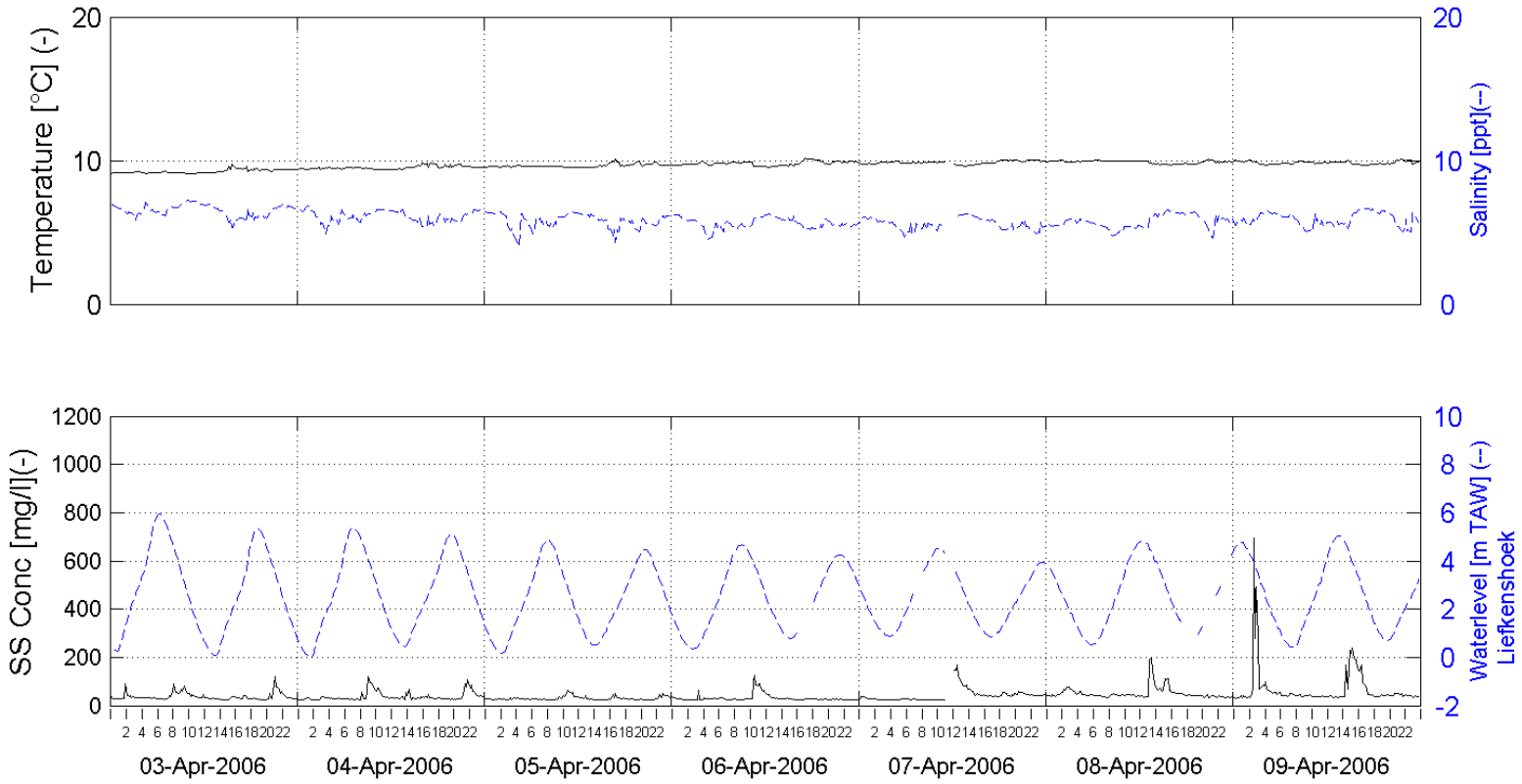
Processed by:

IMDC

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

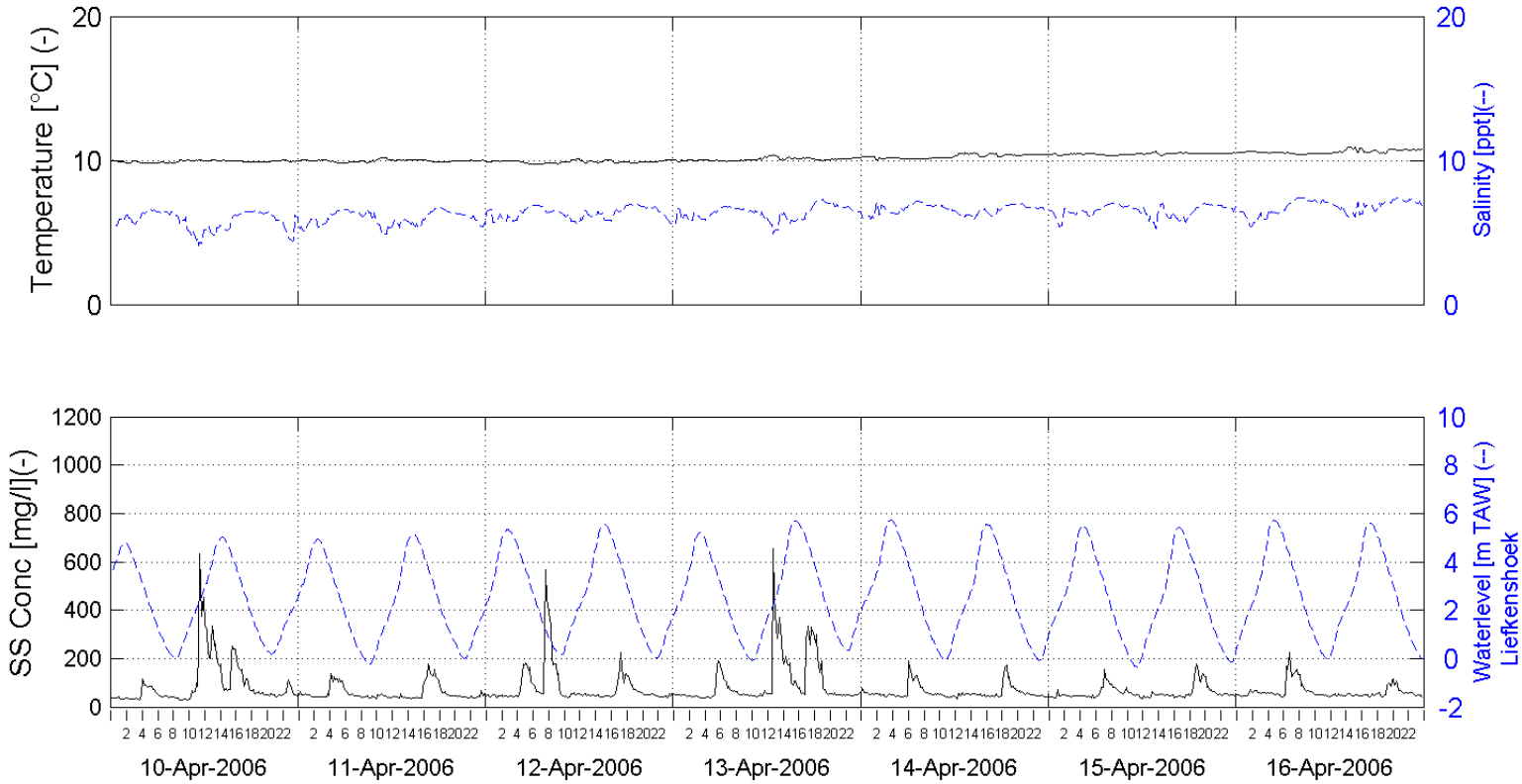
S-BACK 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

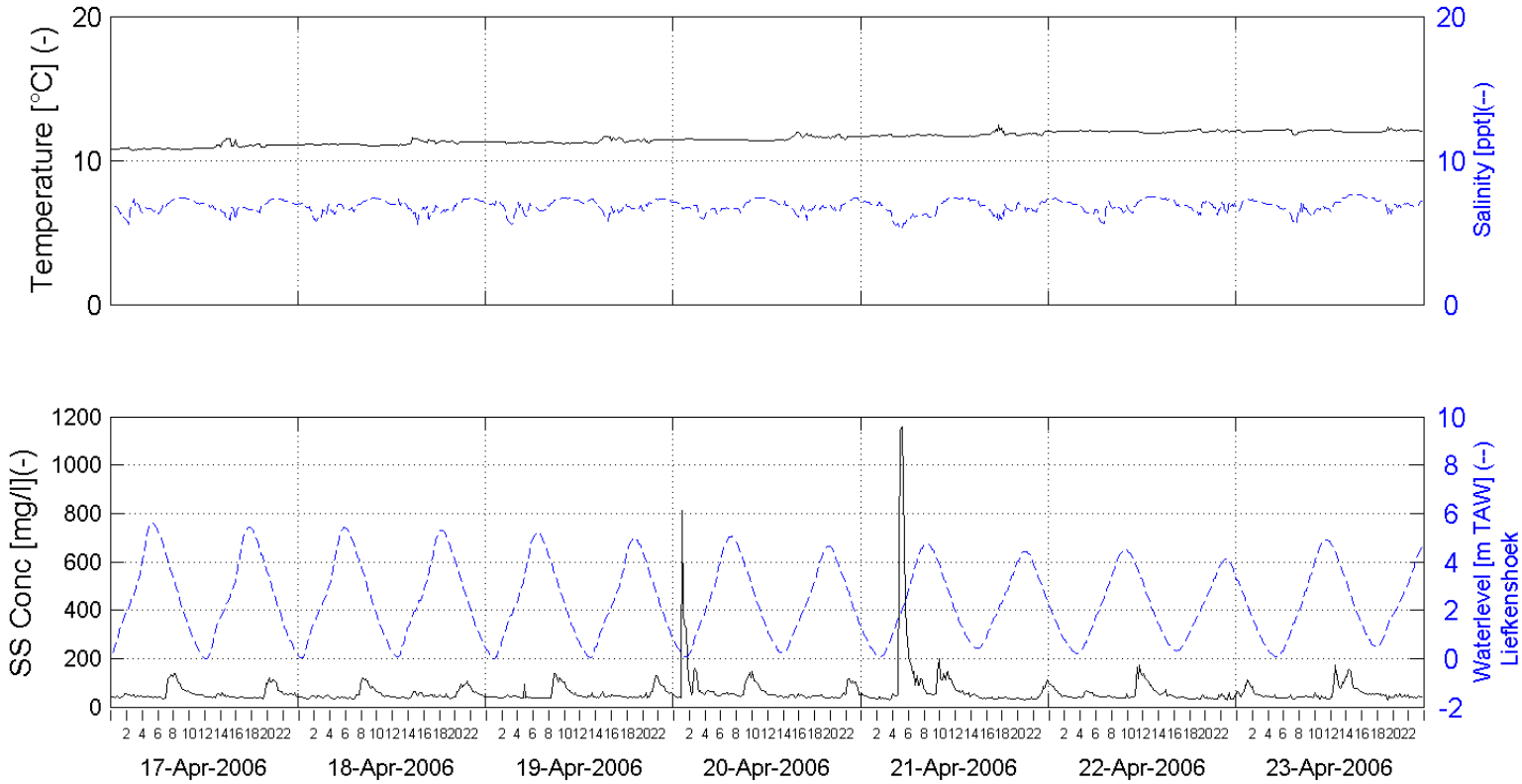
S-BACK 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

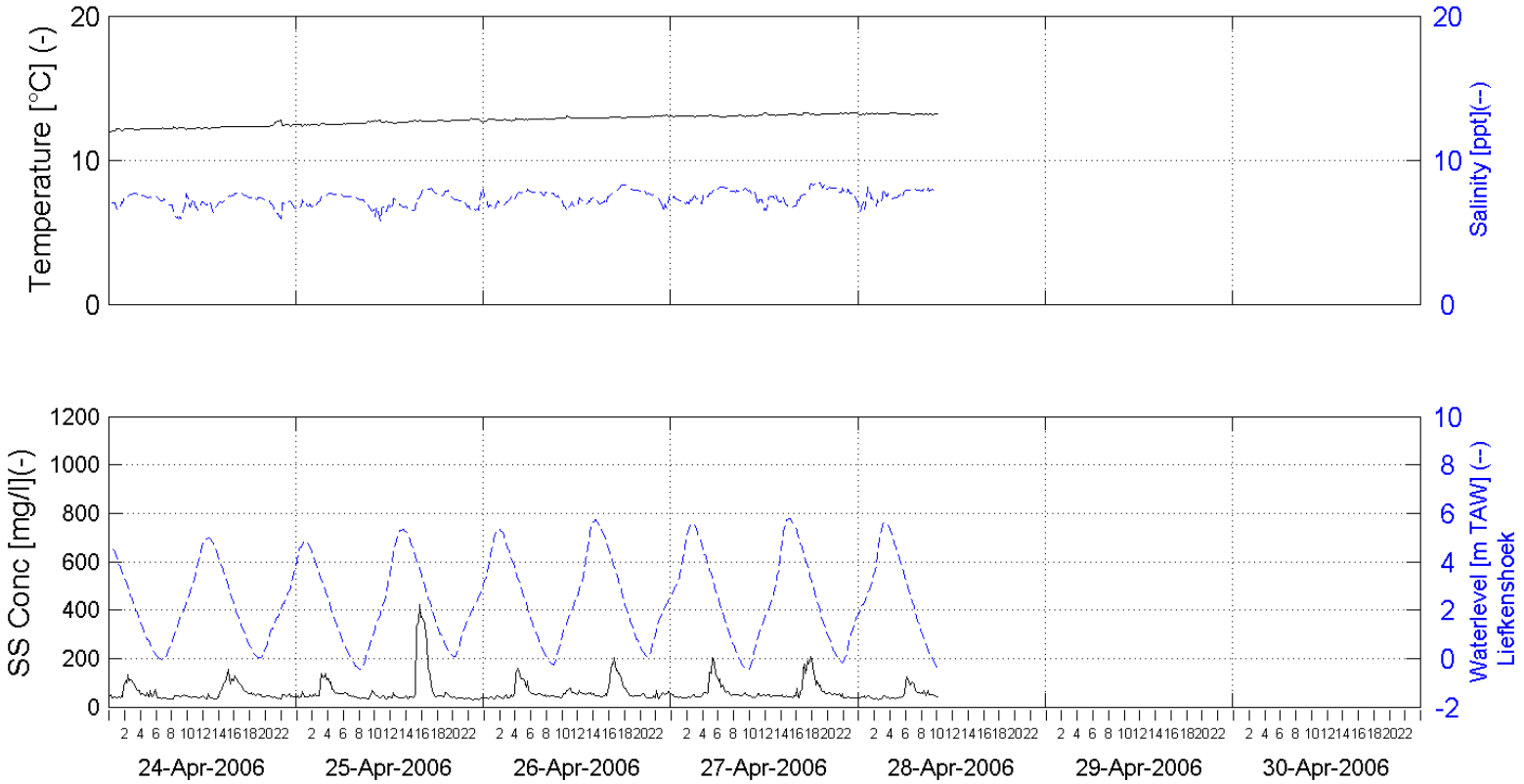
S-BACK 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

S-BACK 3.15m above bottom (-13.85m TAW)

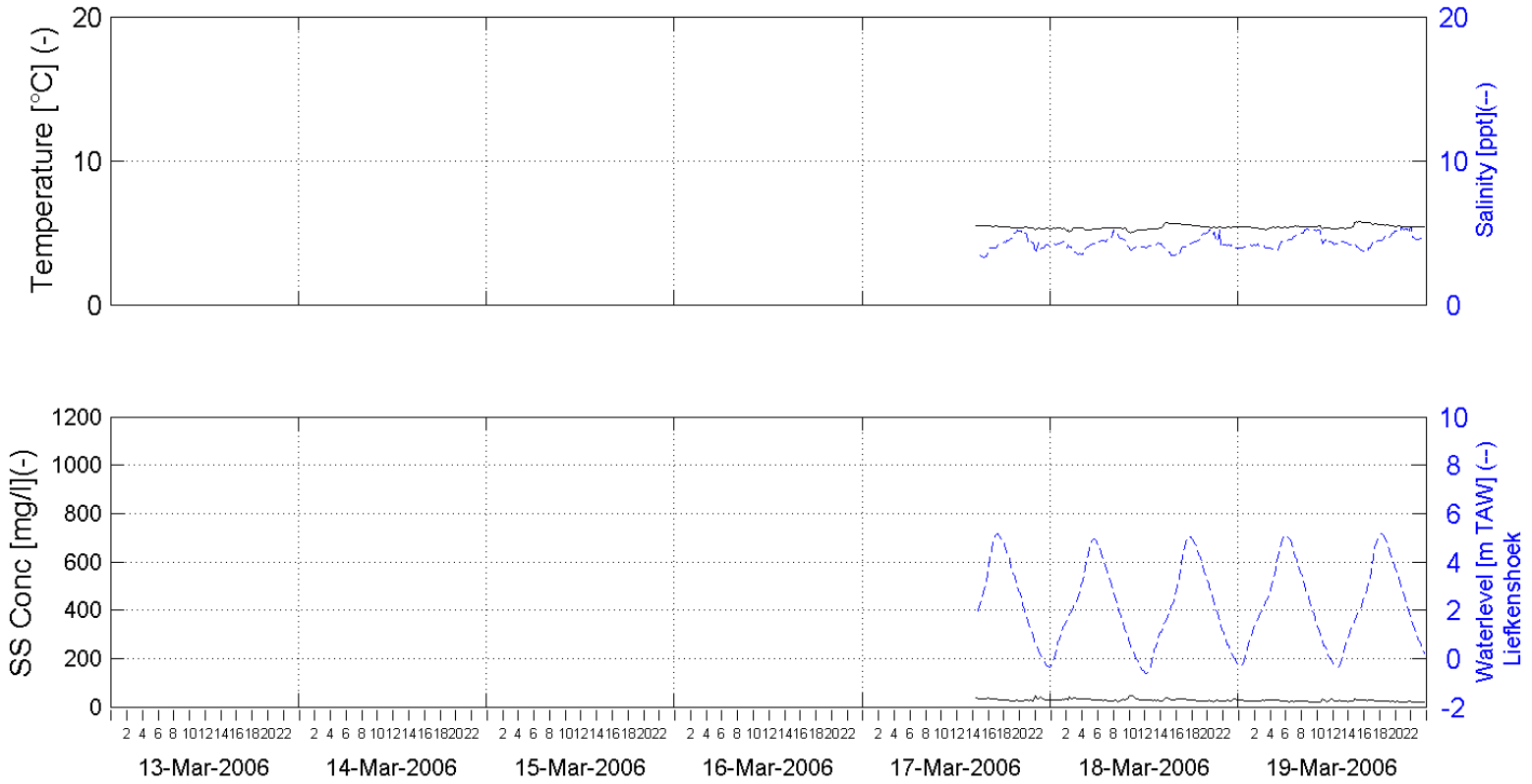
Processed by:

IMDC

In Association with:

11283 - Long-term monitoring DGD

Week 11 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

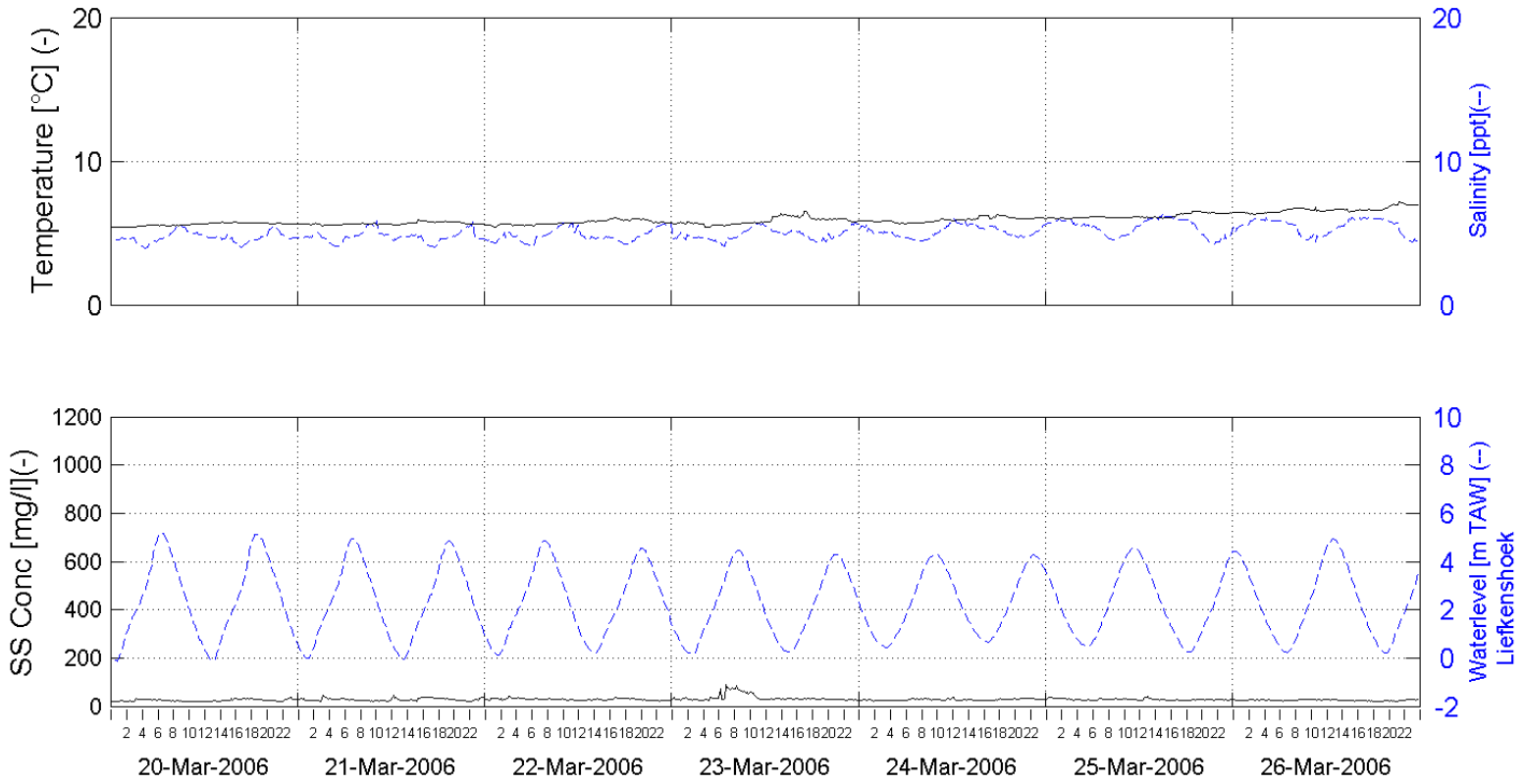
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

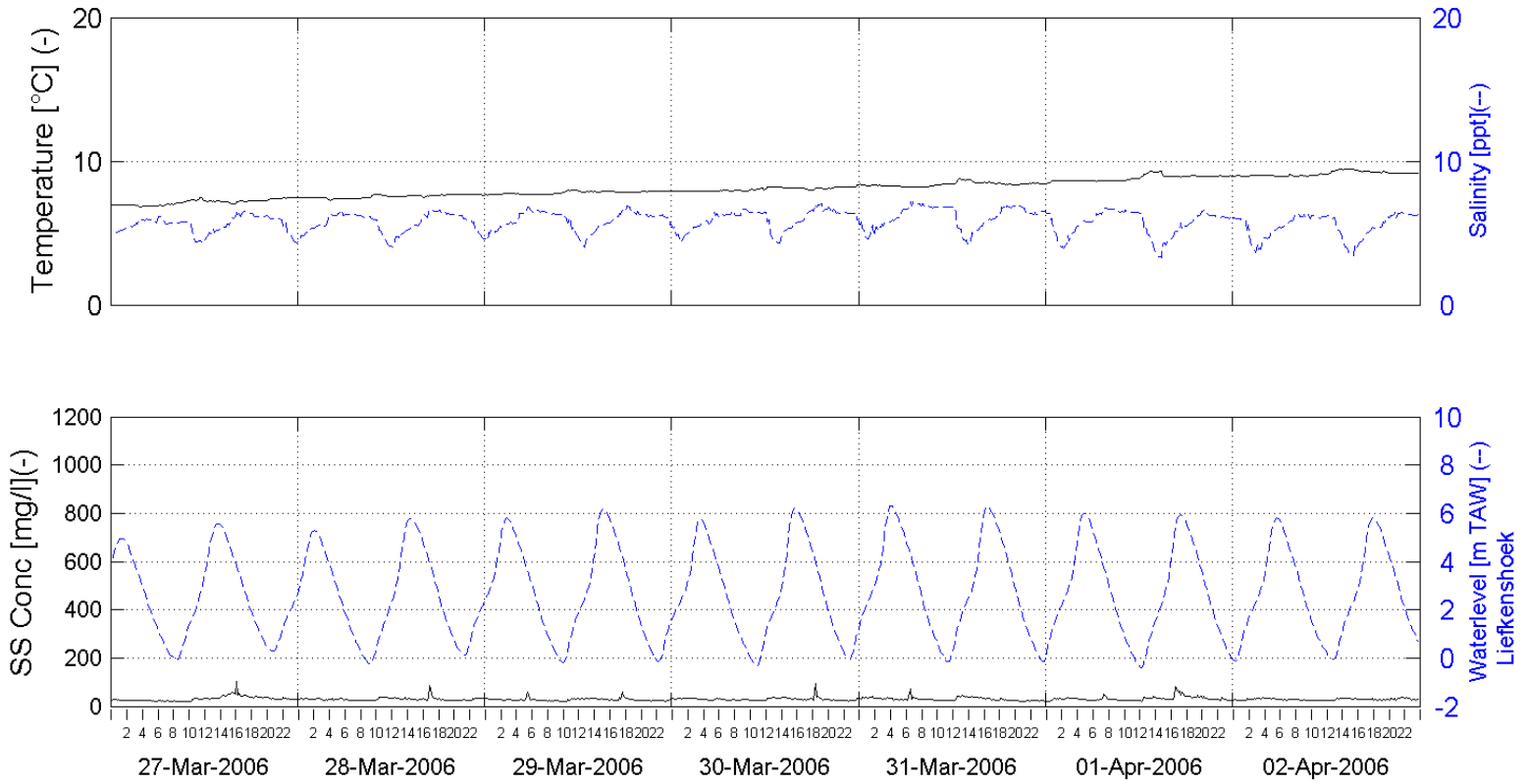
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

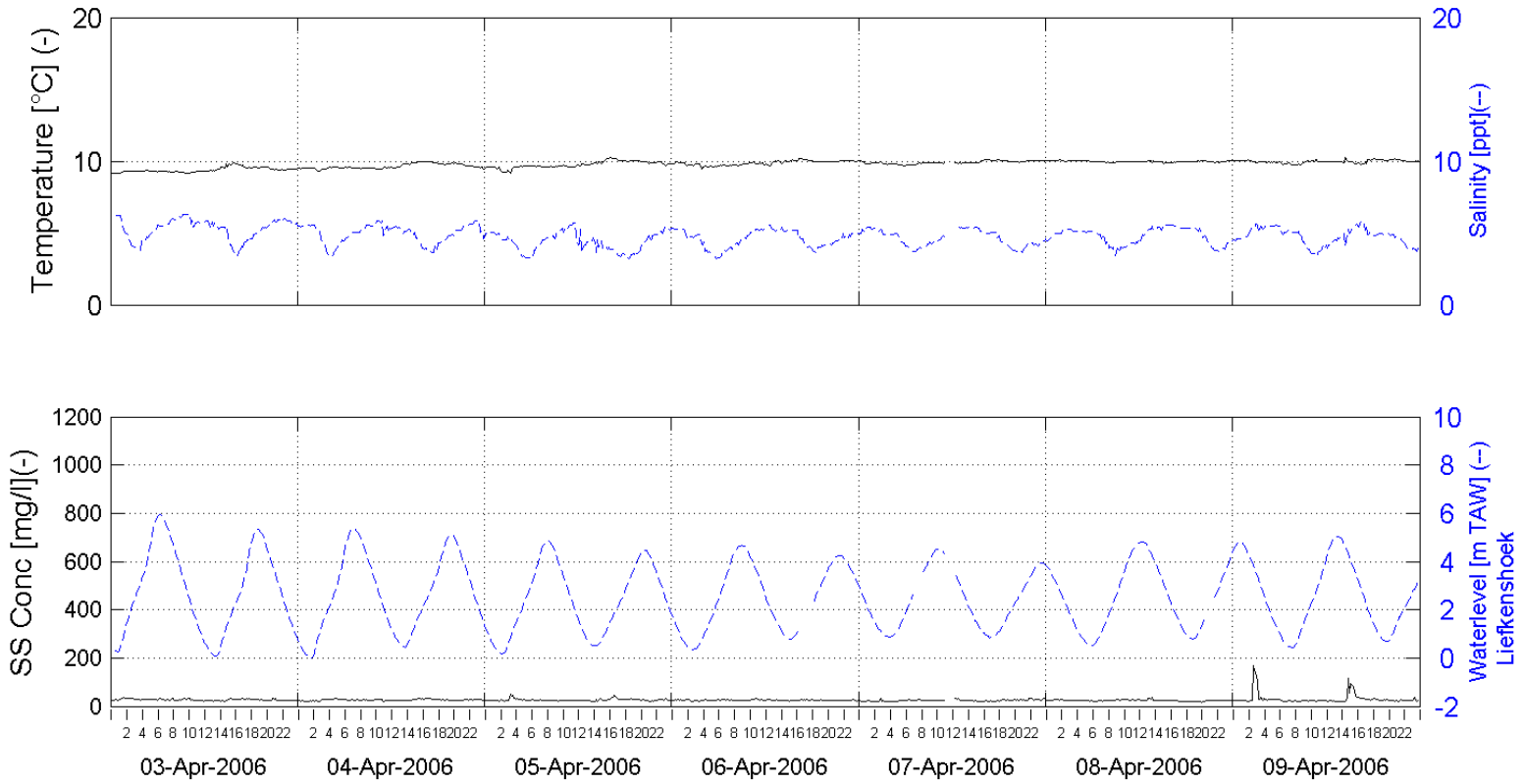
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

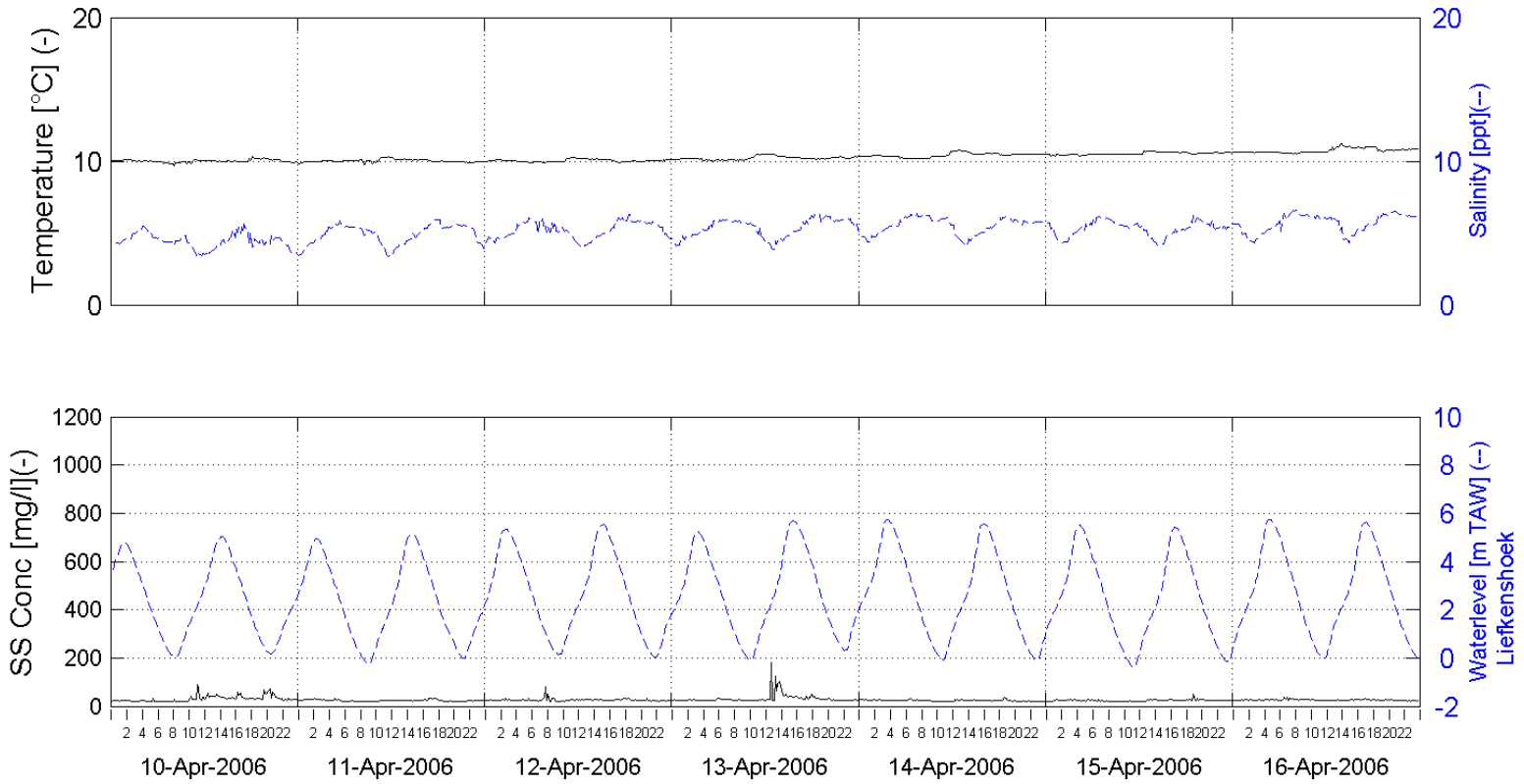
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

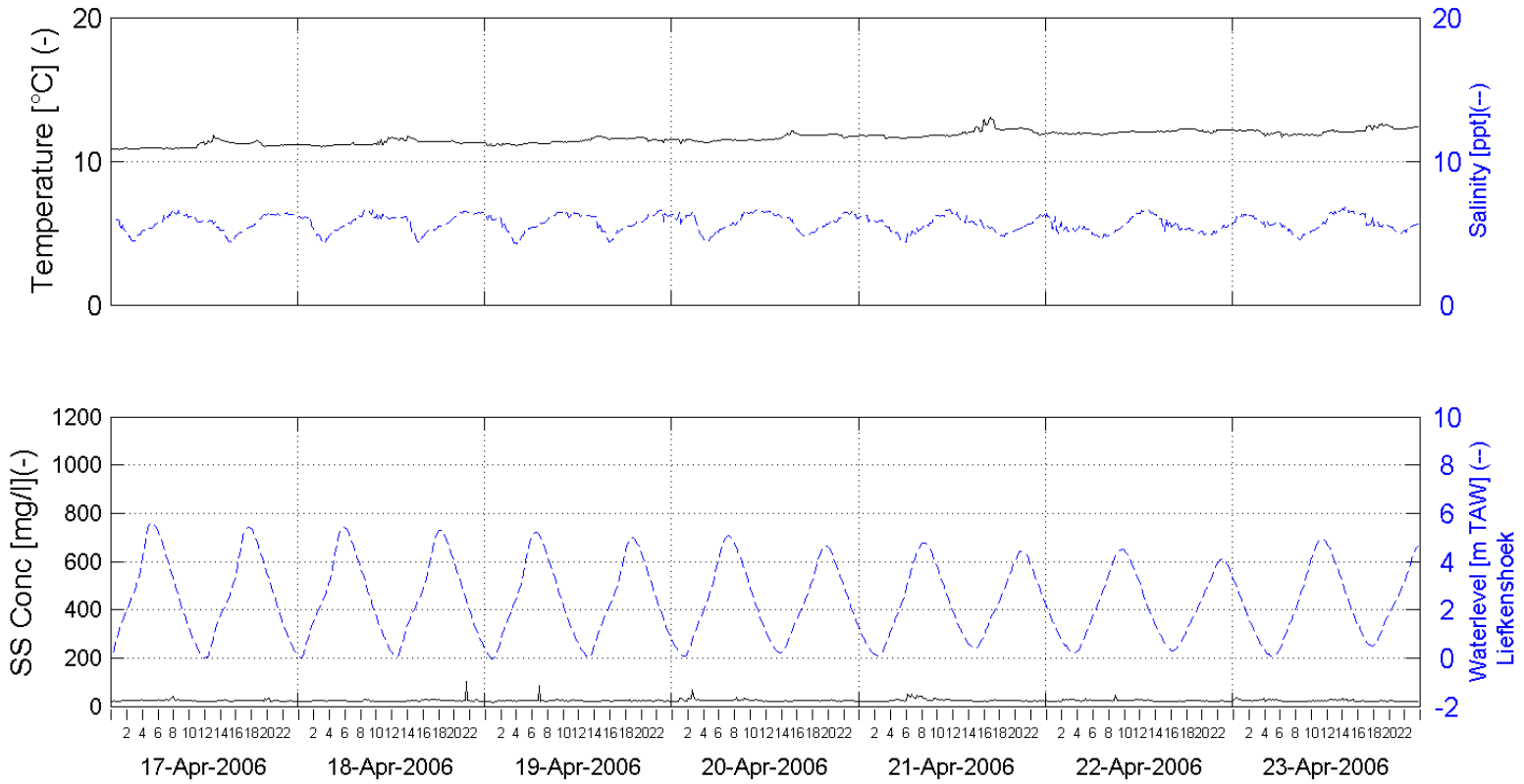
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

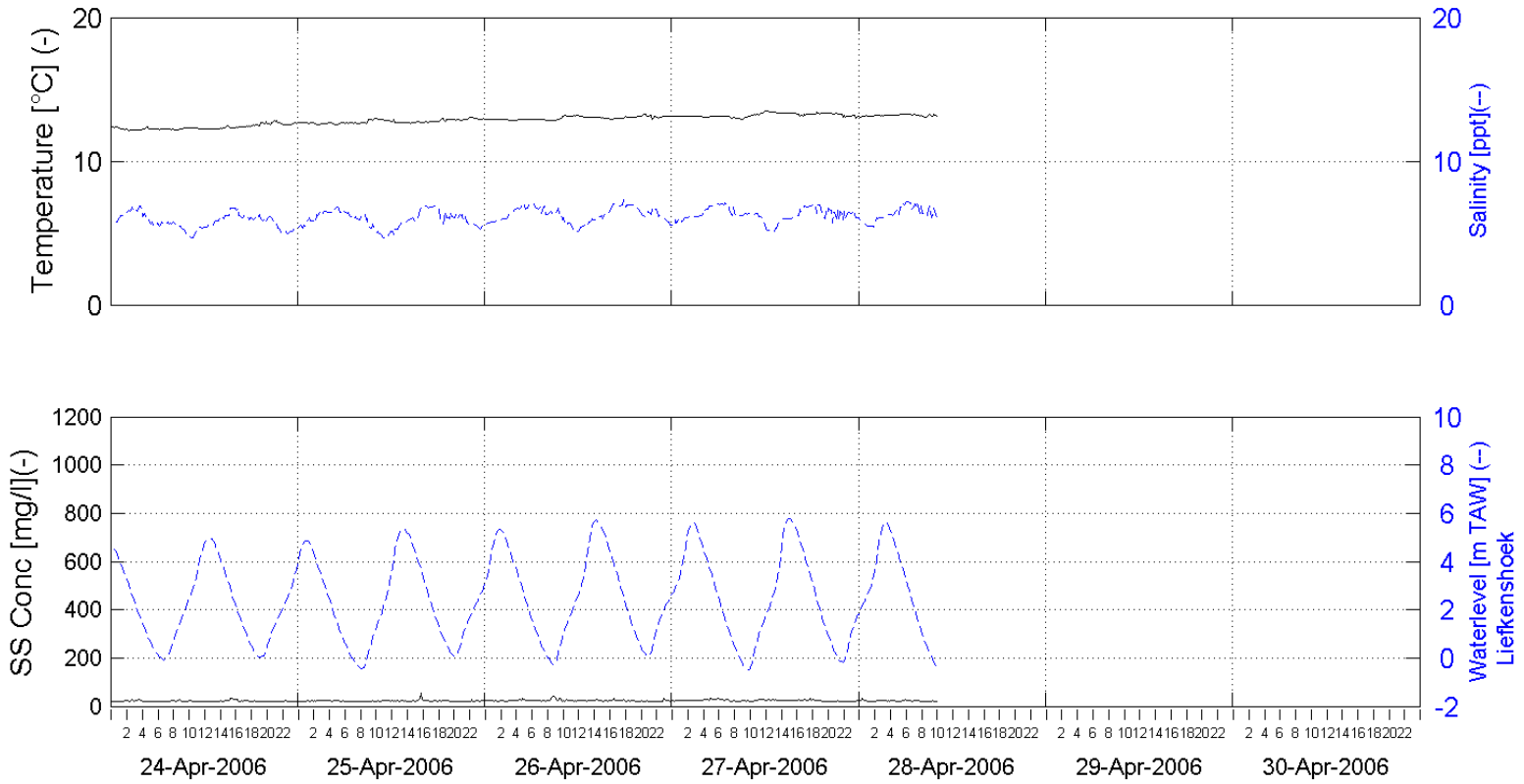
S-BACK 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature, SS Concentration and Tide

Location:

S-BACK 15m above bottom (-2m TAW)

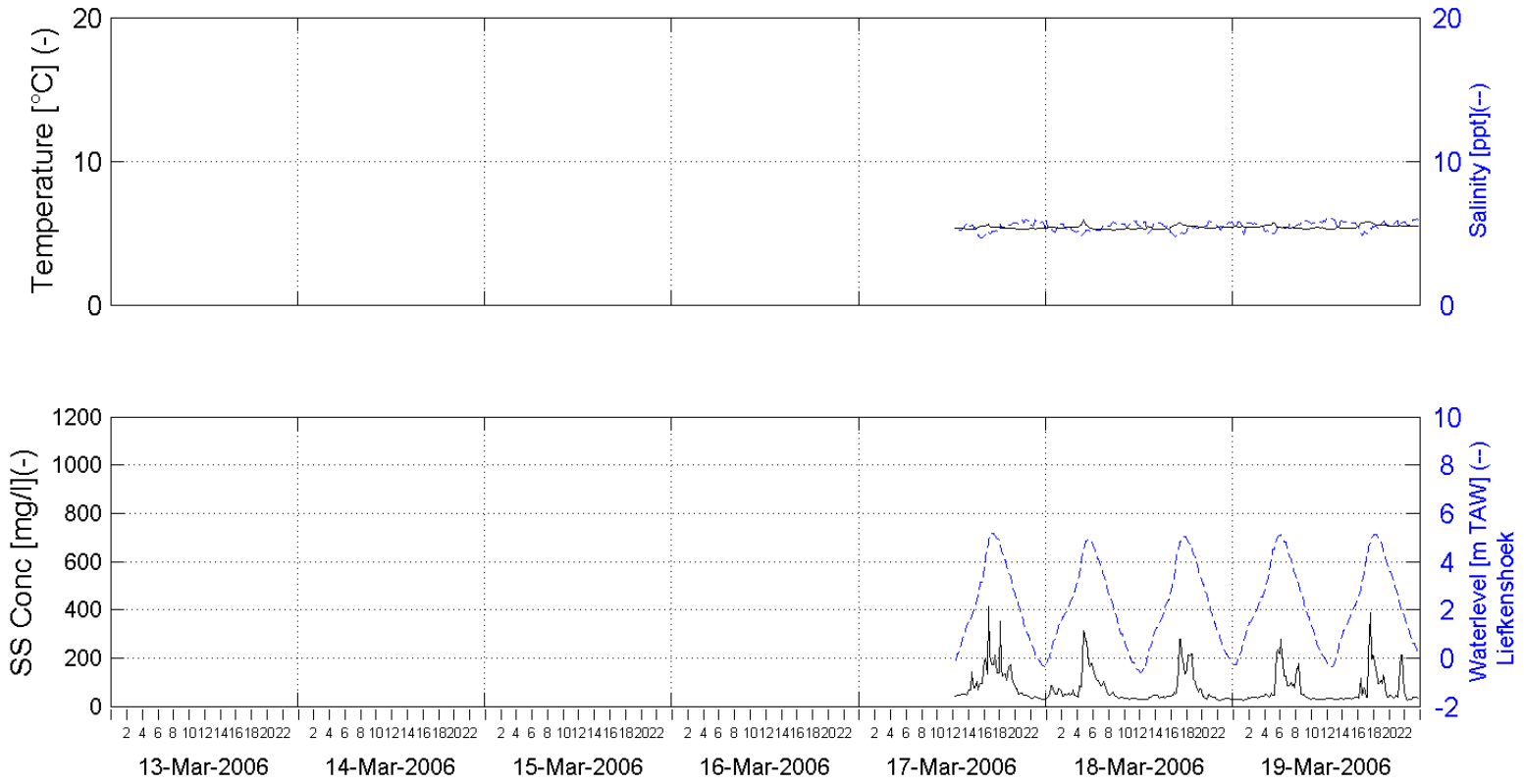
Processed by:

In Association with:

B.3 P&O 2 (S-ENTRANCE)

11283 - Long-term monitoring DGD

Week 11 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

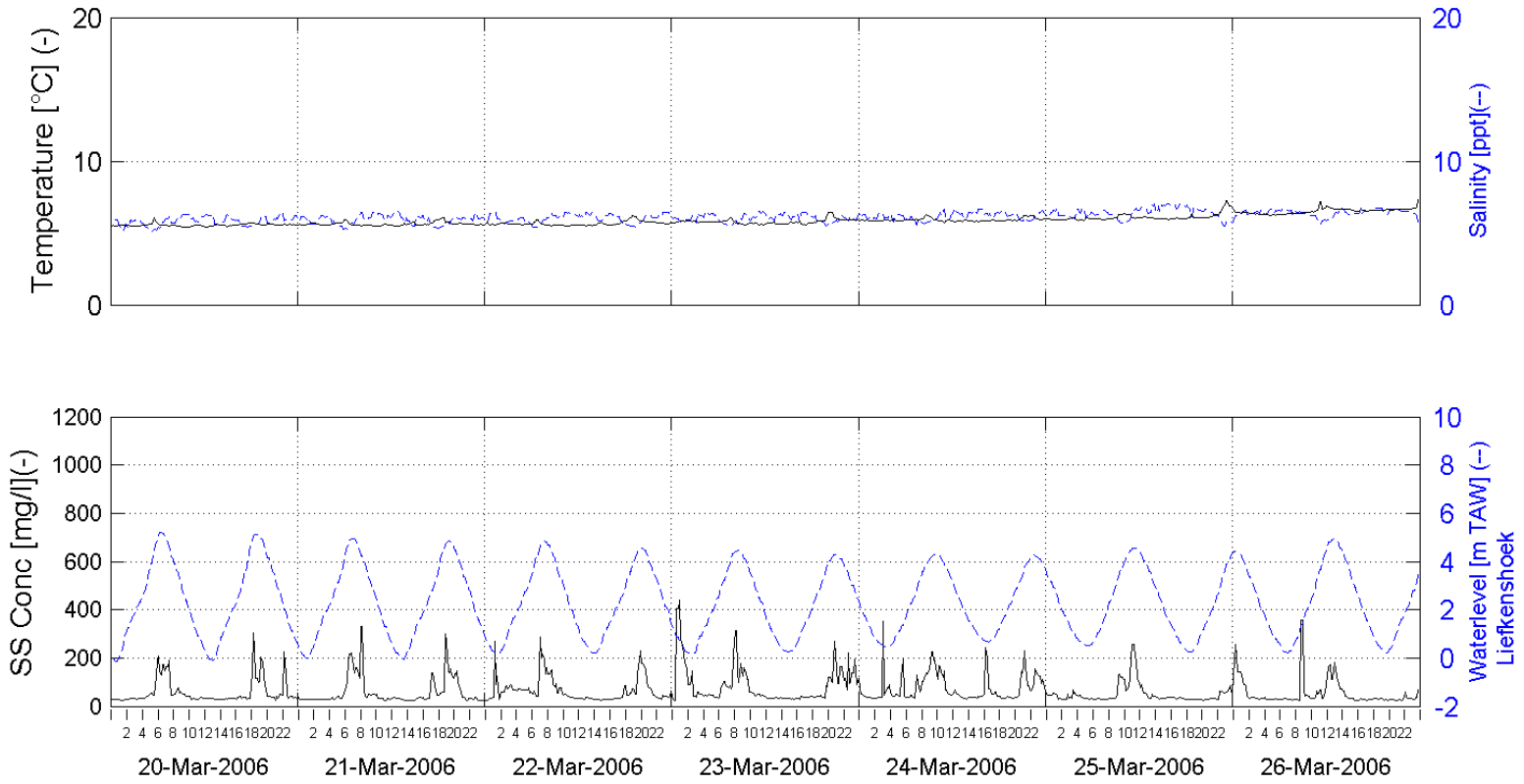
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

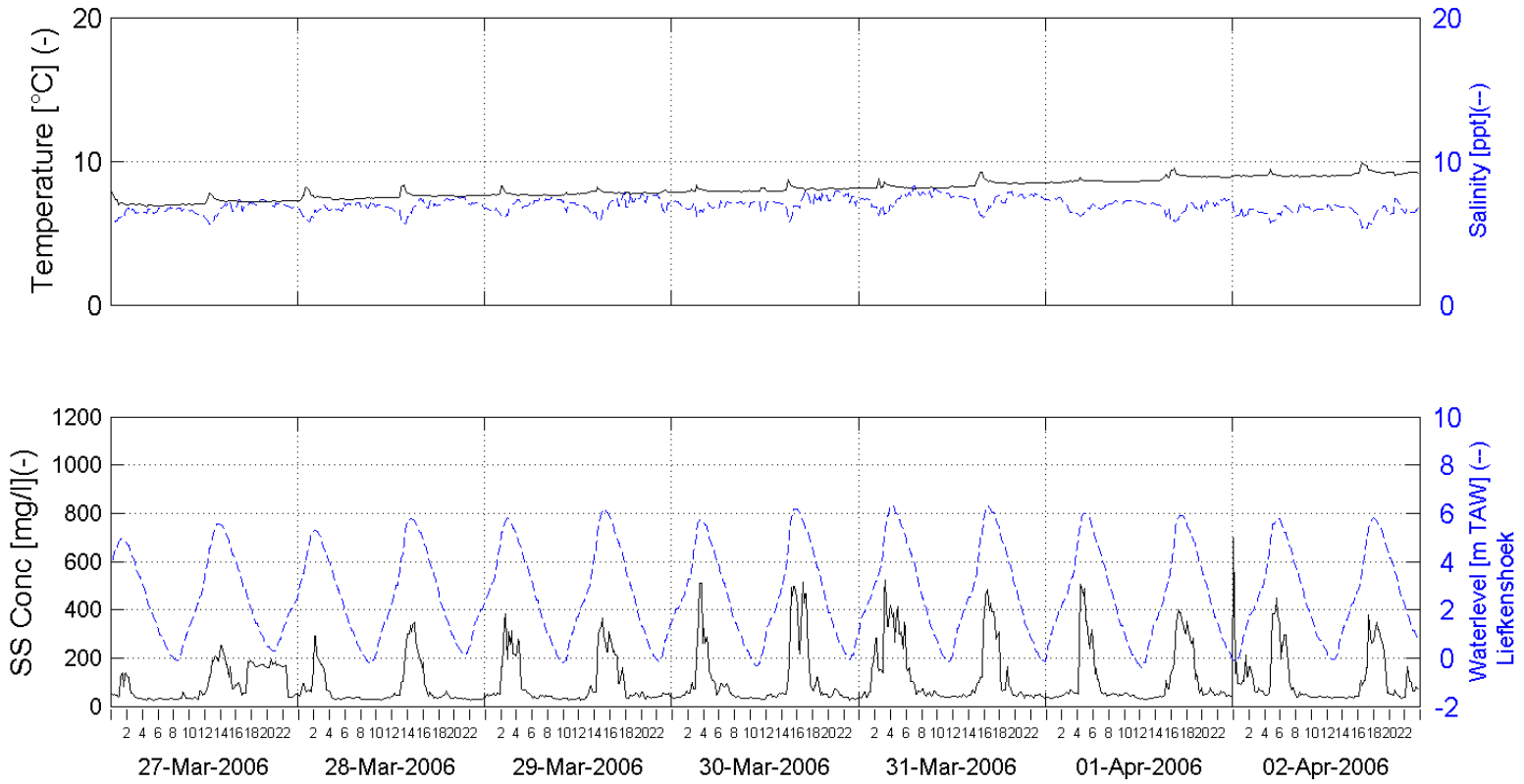
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

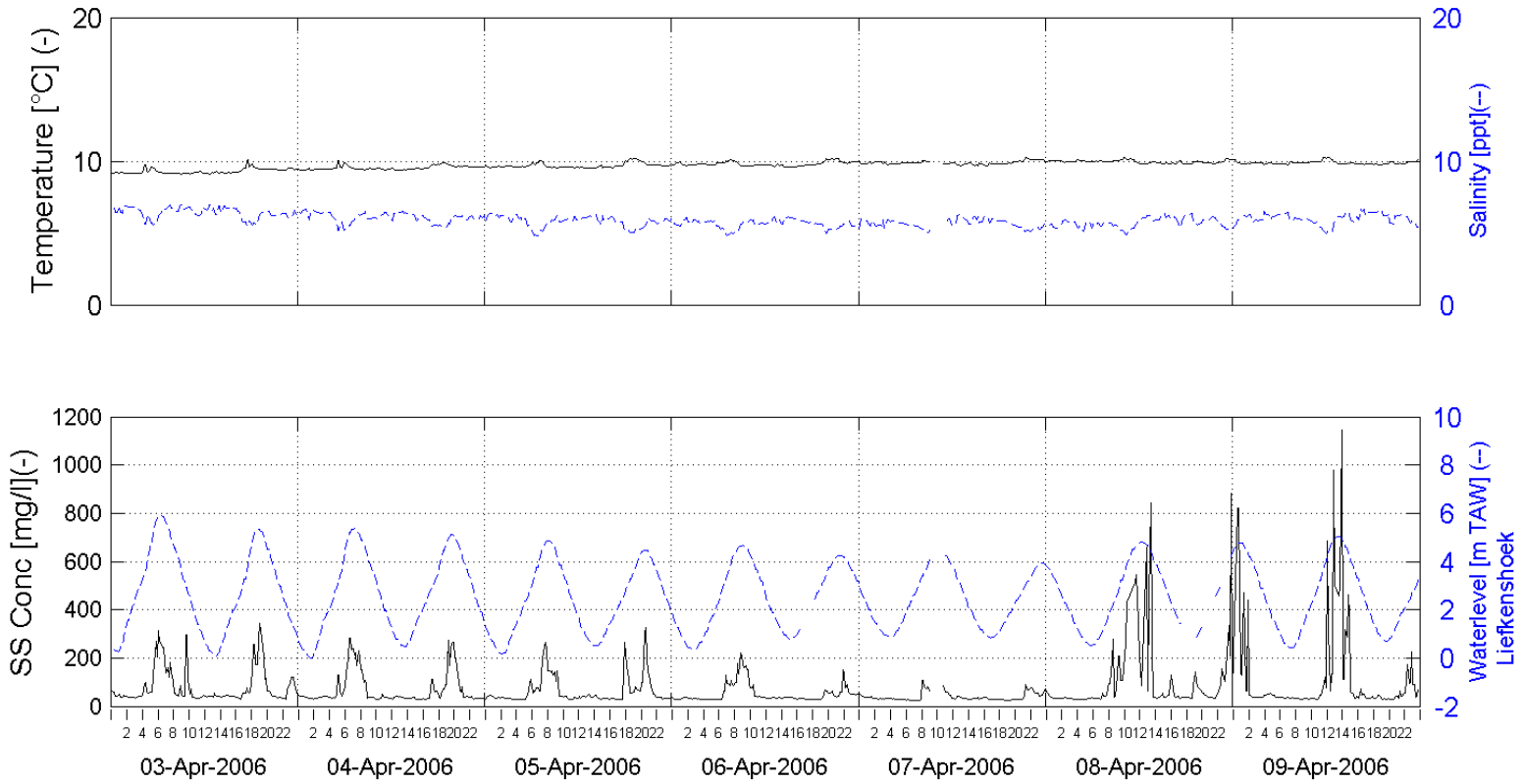
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

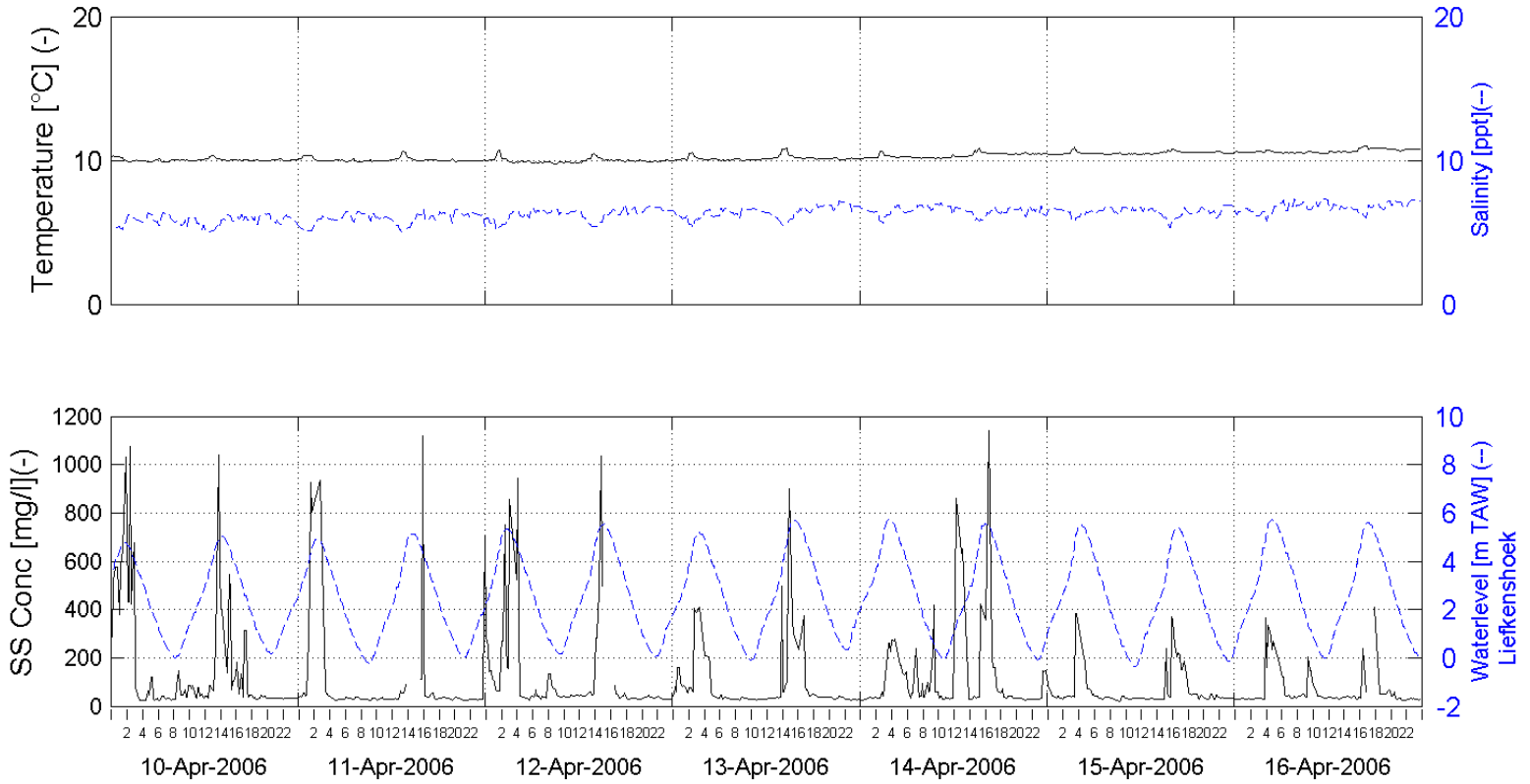
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

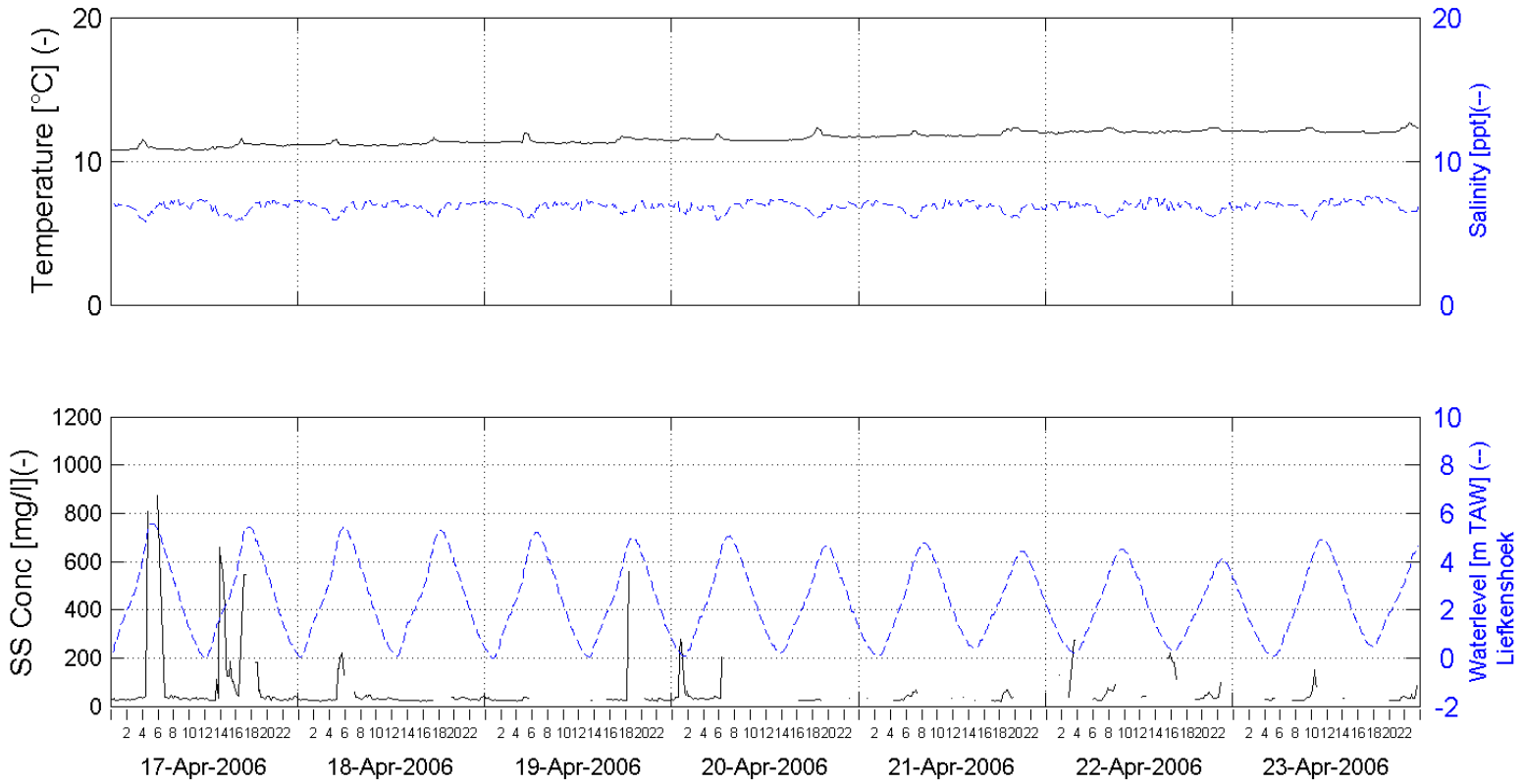
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

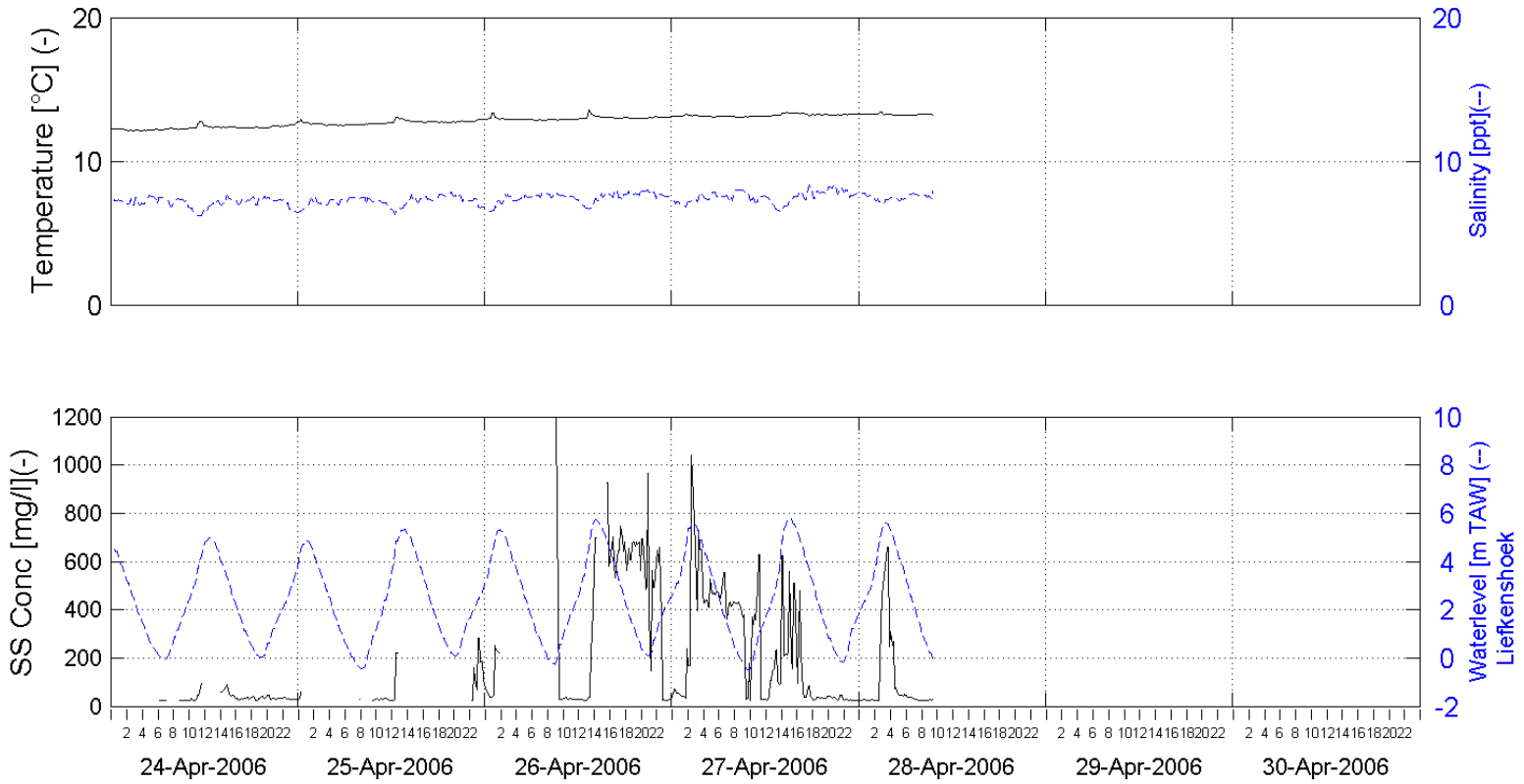
S-ENTRANCE 3.15m above bottom (-13.85m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

S-ENTRANCE 3.15m above bottom (-13.85m TAW)

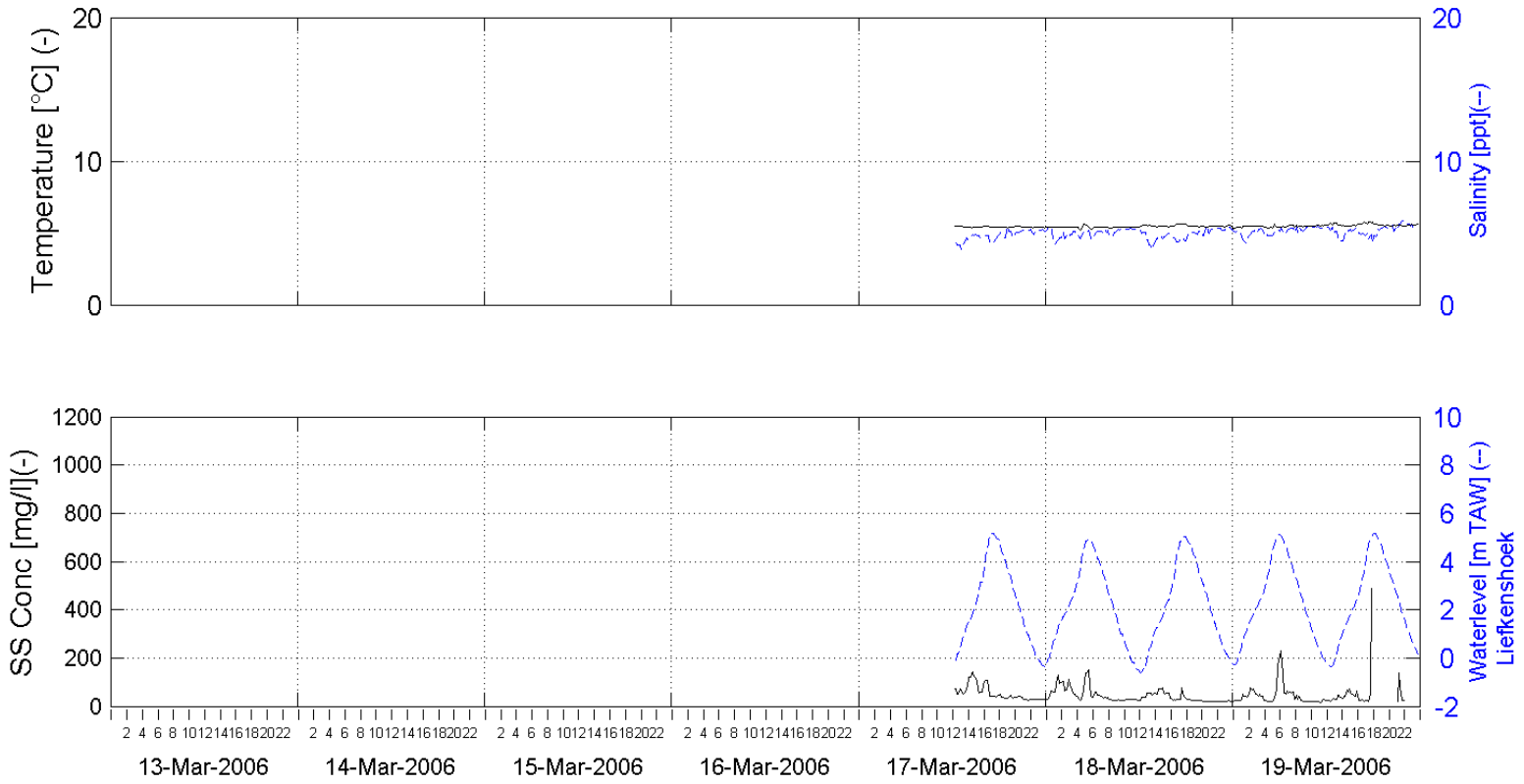
Processed by:

IMDC

In Association with:

11283 - Long-term monitoring DGD

Week 11 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

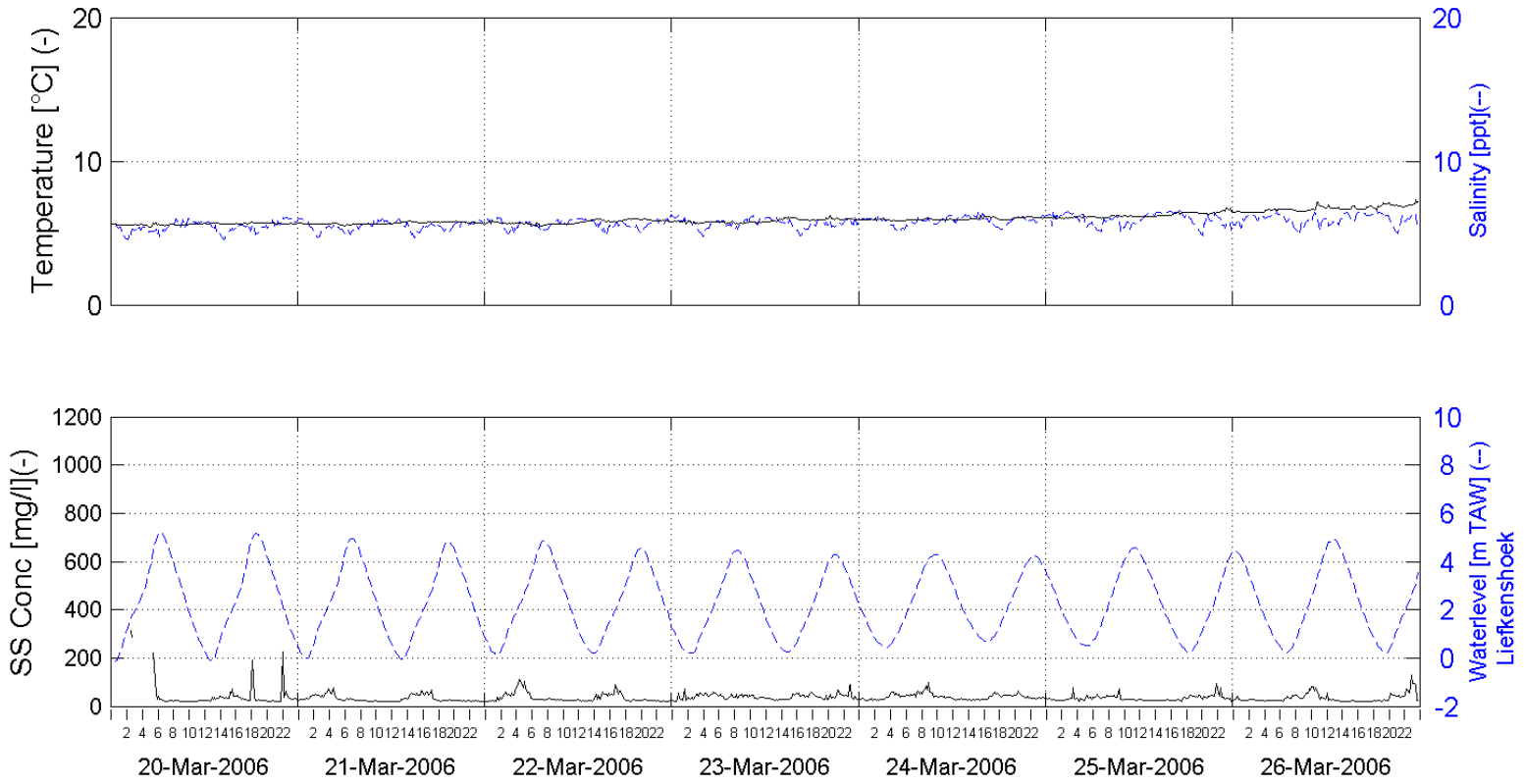
S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 12 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

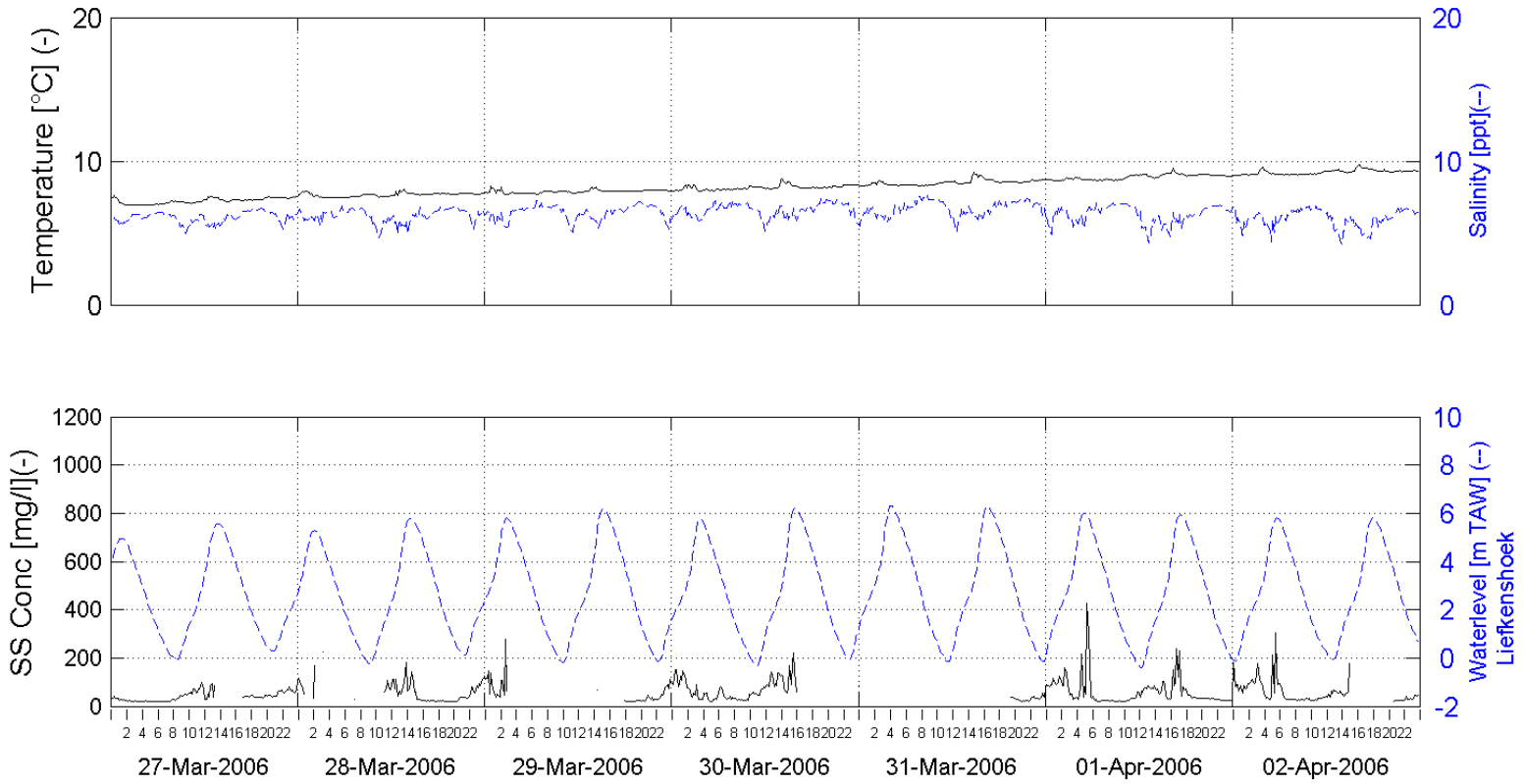
S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 13 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

S-ENTRANCE 15m above bottom (-2m TAW)

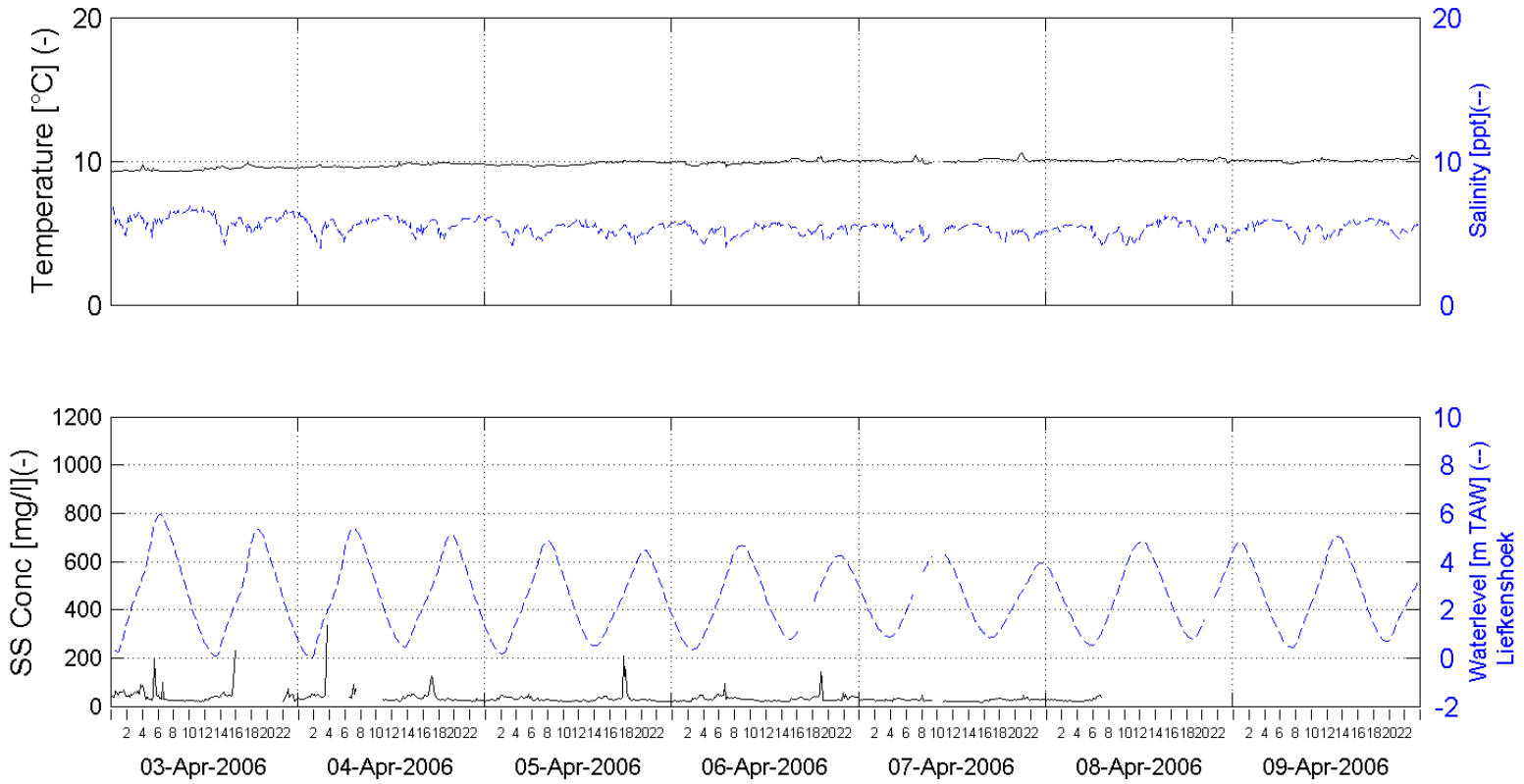
Processed by:

IMDC

In Association with:

11283 - Long-term monitoring DGD

Week 14 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

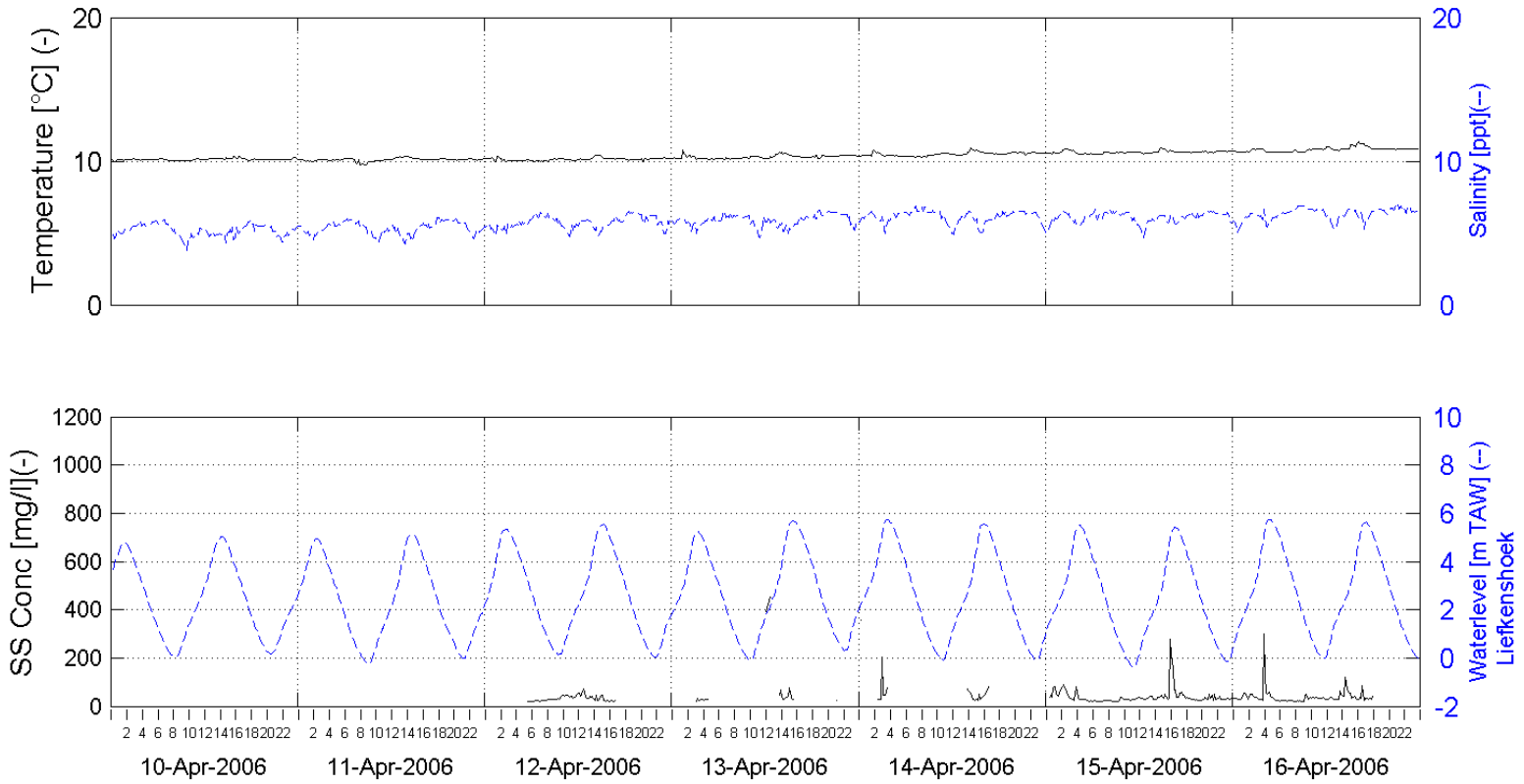
S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 15 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

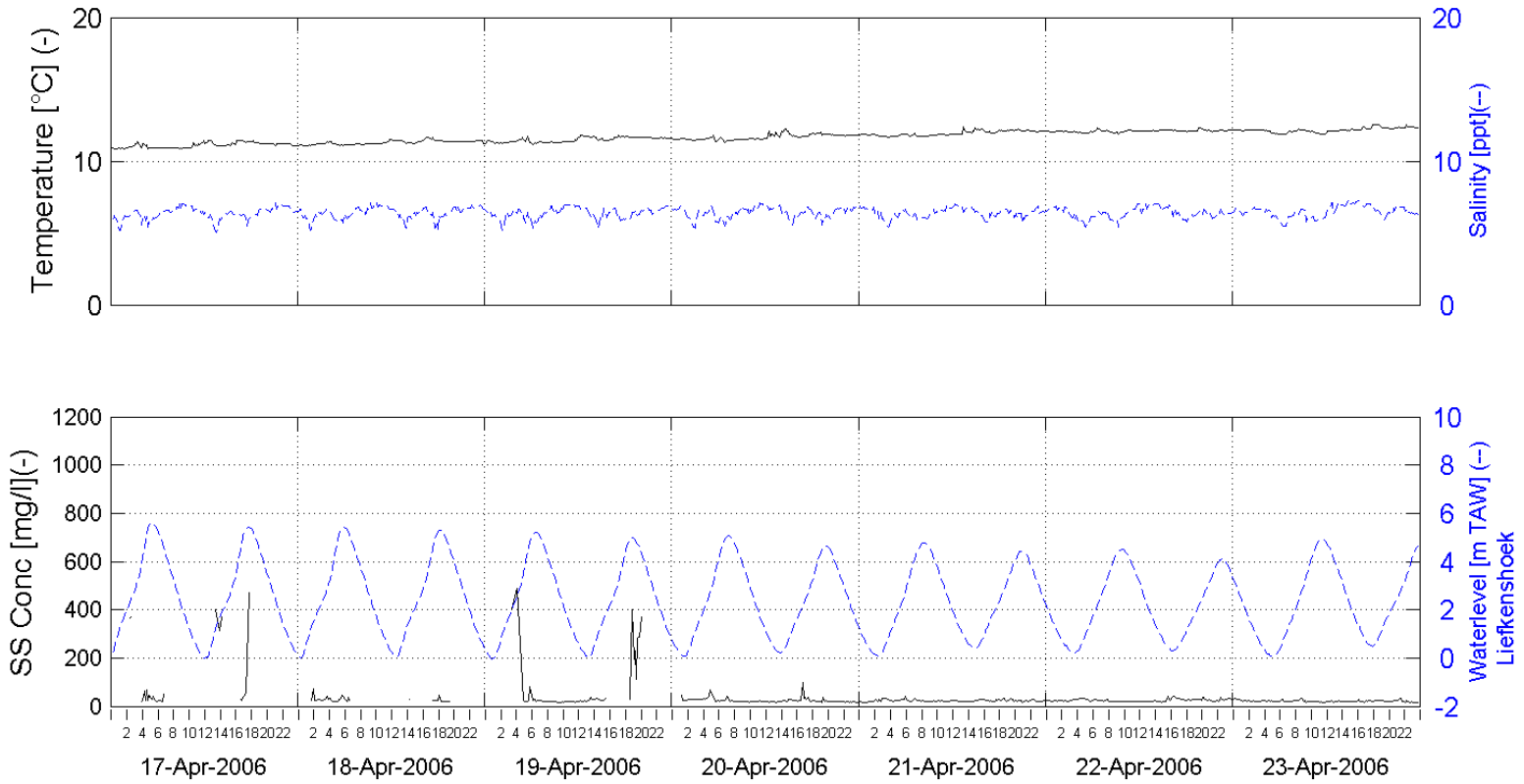
S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 16 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

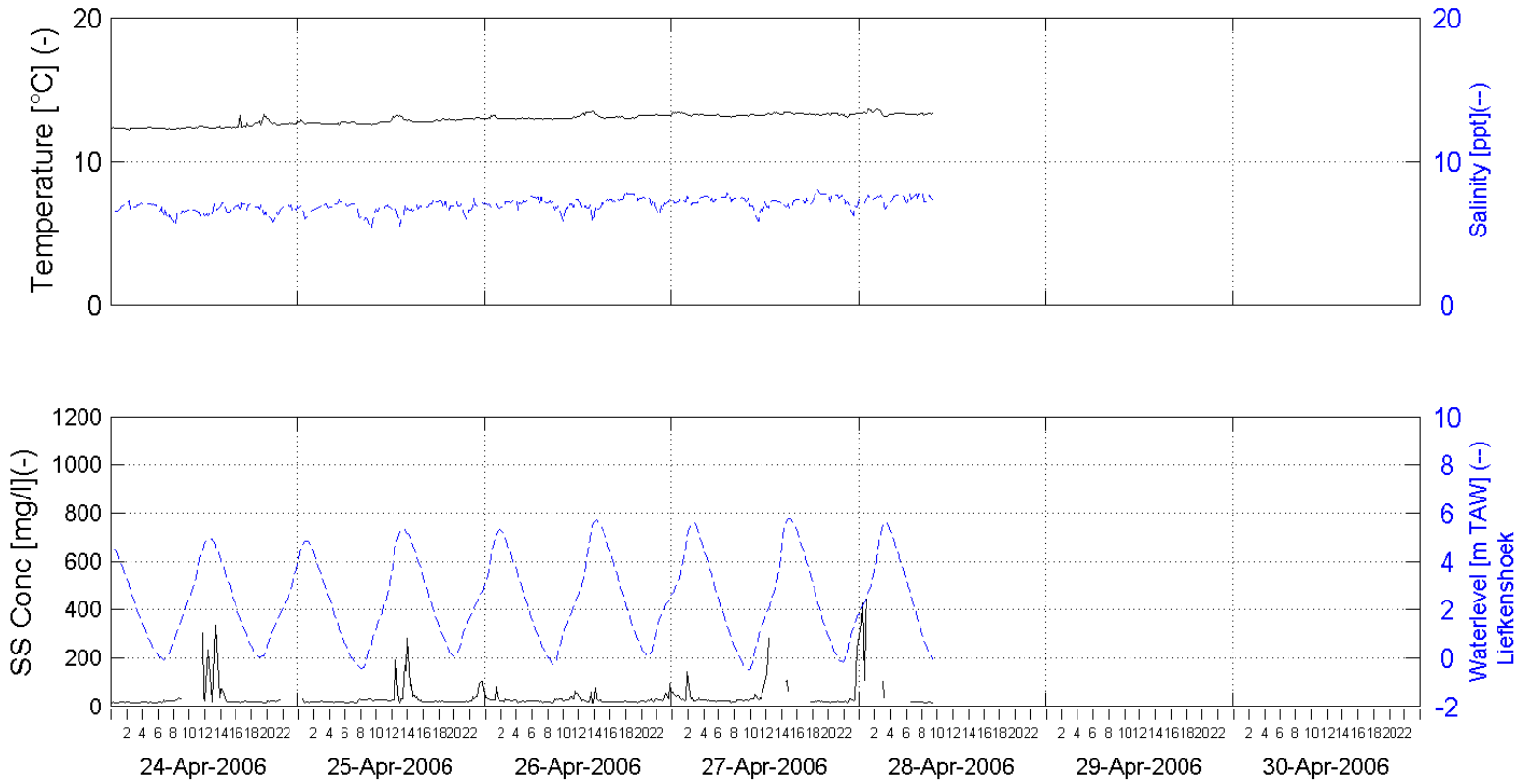
S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

11283 - Long-term monitoring DGD

Week 17 - 2006



Week series of Salinity, Temperature,
SS Concentration and Tide

Location:

S-ENTRANCE 15m above bottom (-2m TAW)

Processed by:

In Association with:

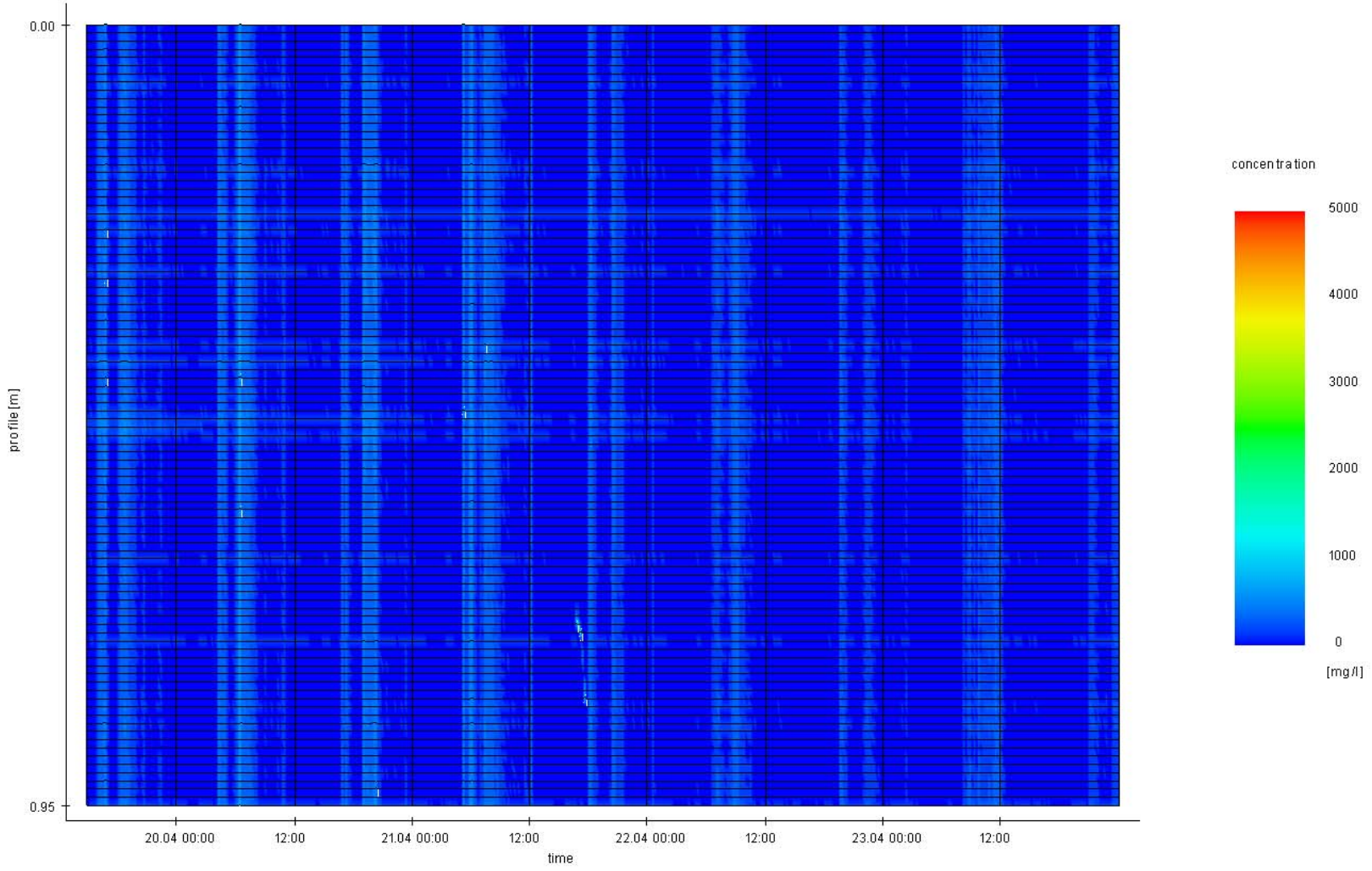
APPENDIX C.

WEEKSERIES, AVERAGE TIDE & TABLES

ARGUS ASM – IV & ALTUS (MET TIME)

C.1 CDW frame

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

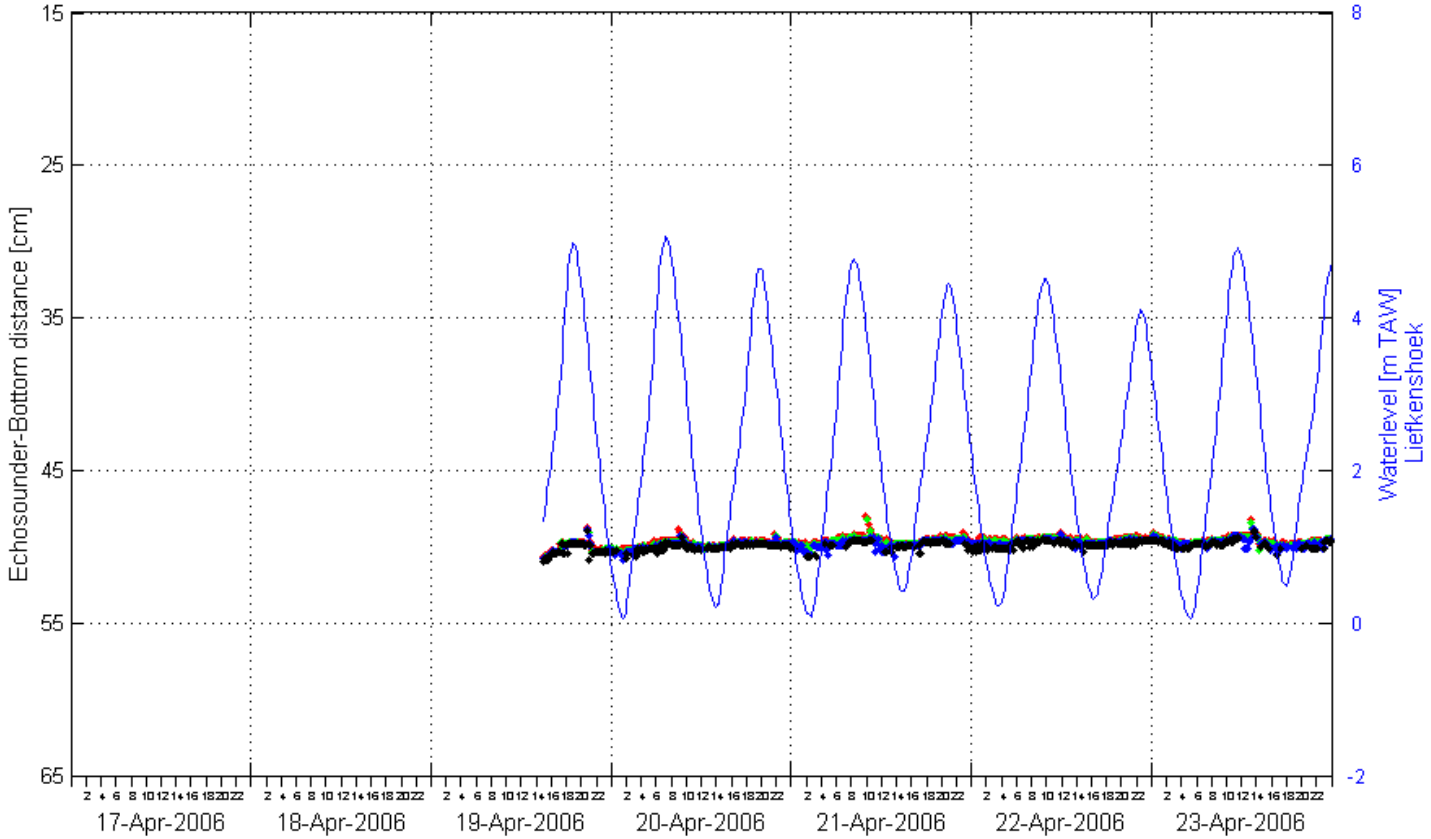
Location:	Date:
Deurganckdok CDW	19/04/2006 – 23/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

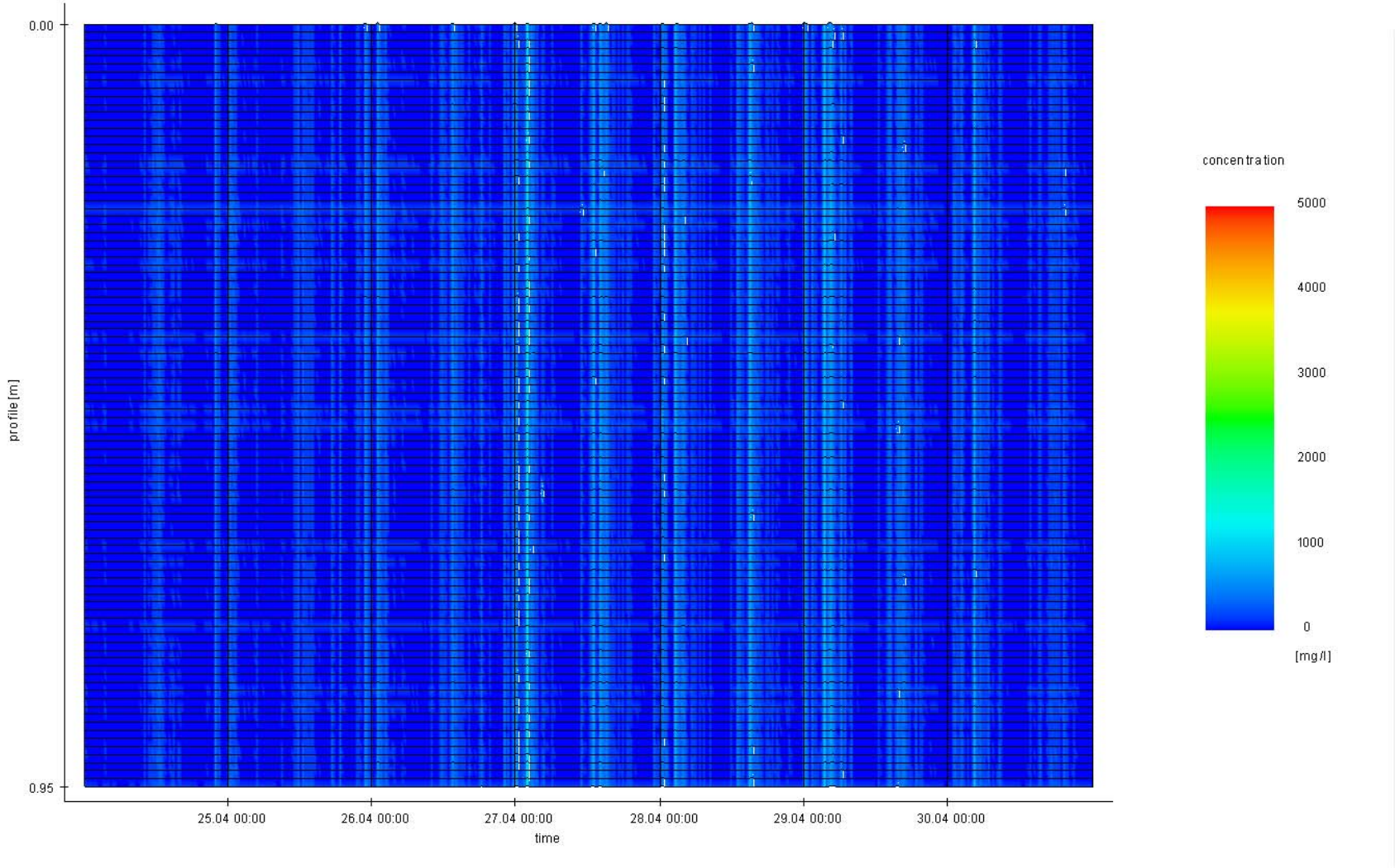
Date:
19/04/2006 – 23/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

Location:
Deurganckdok CDW

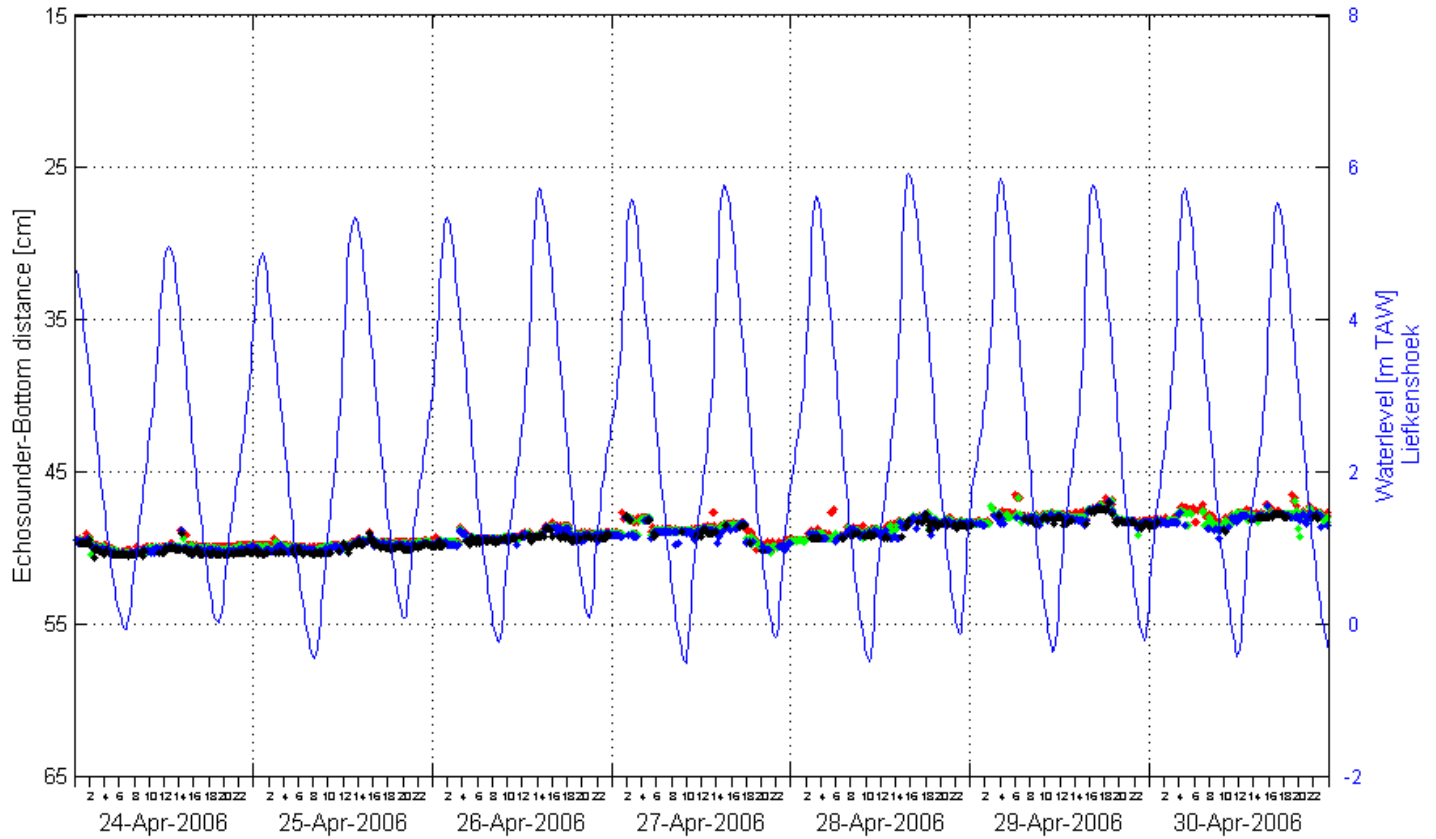
Date:
24/04/2006 – 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

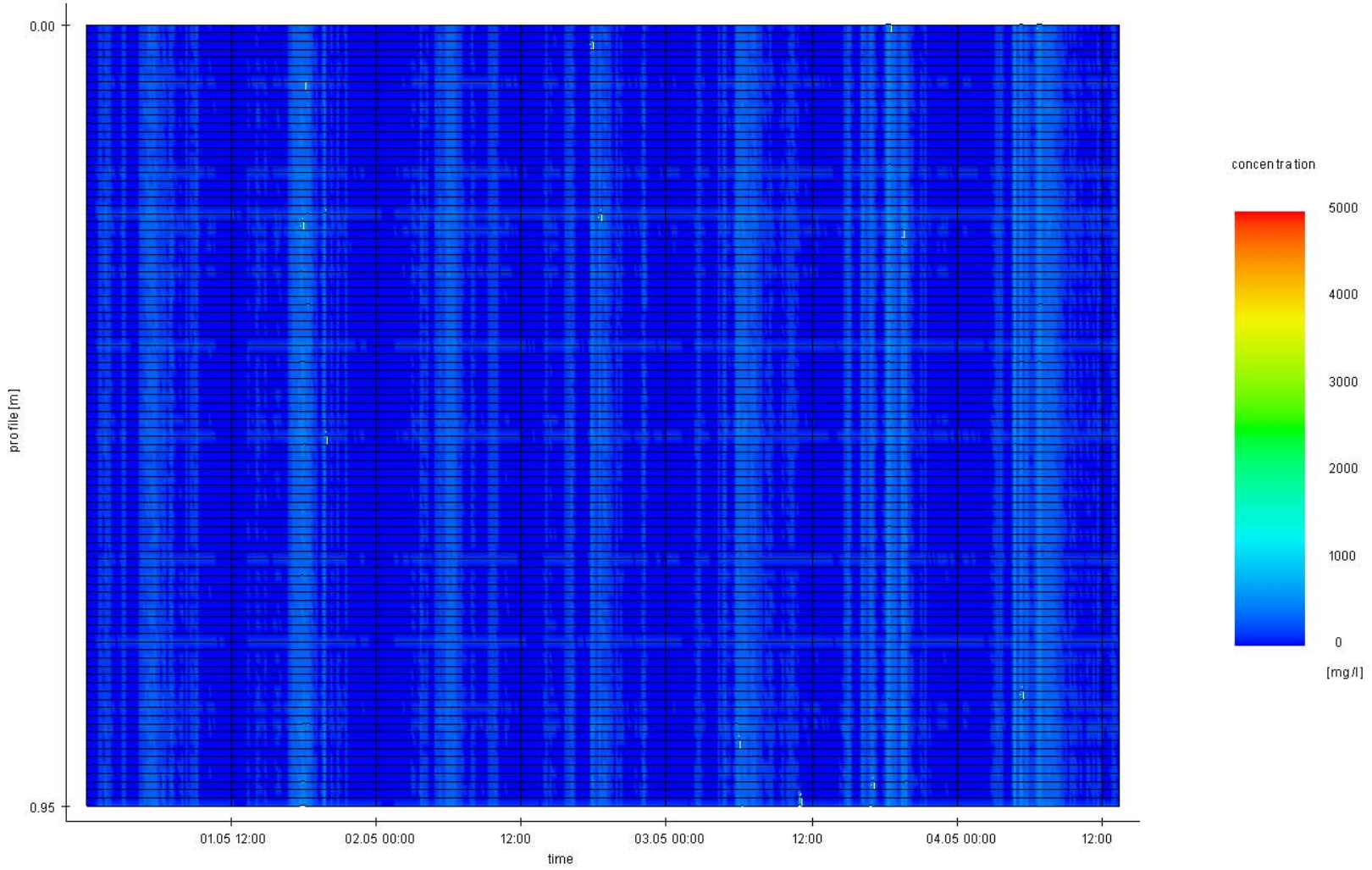
Date:
24/04/2006 – 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

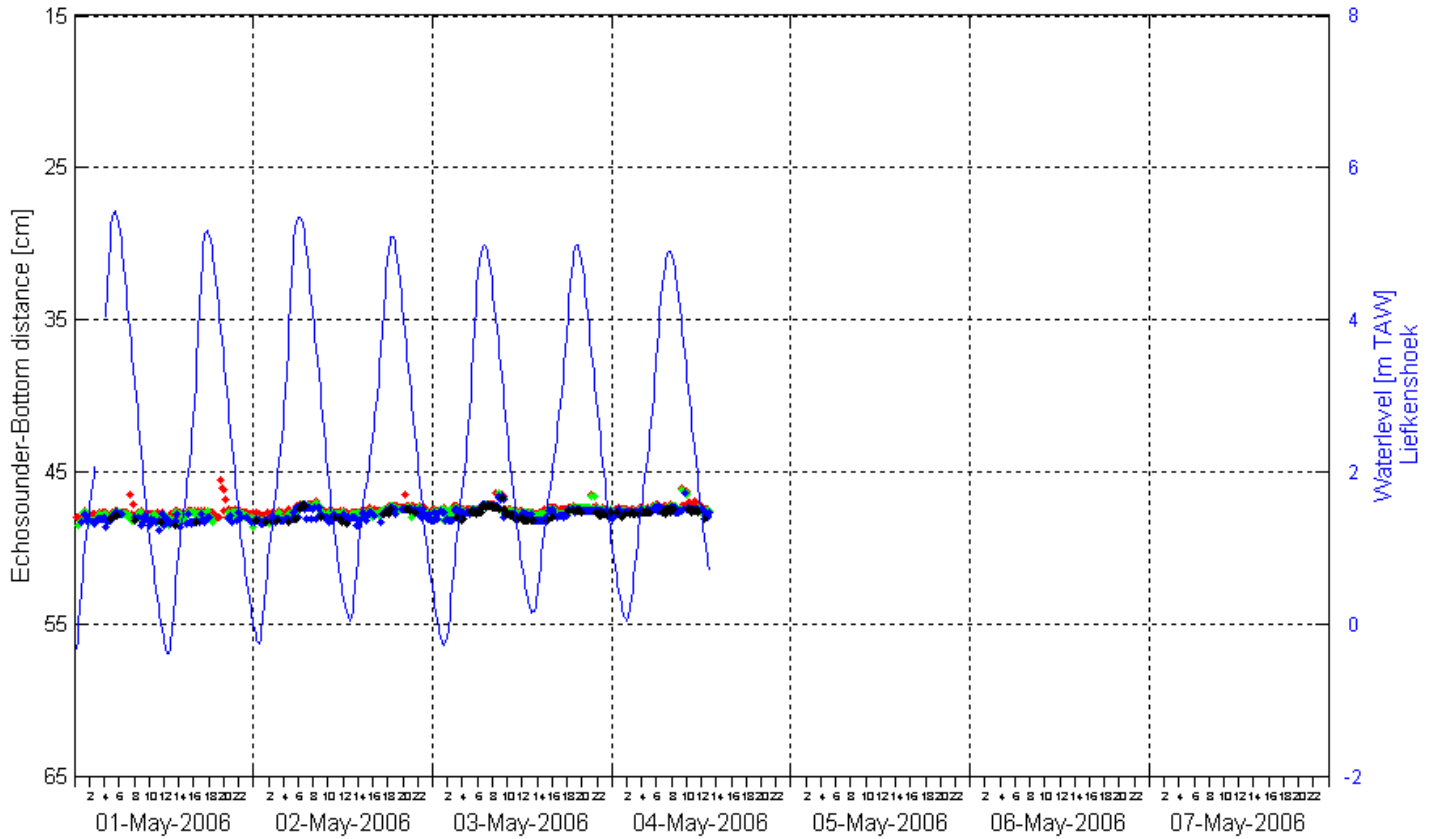
Location:	Date:
Deurganckdok CDW	01/05/2006 – 04/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

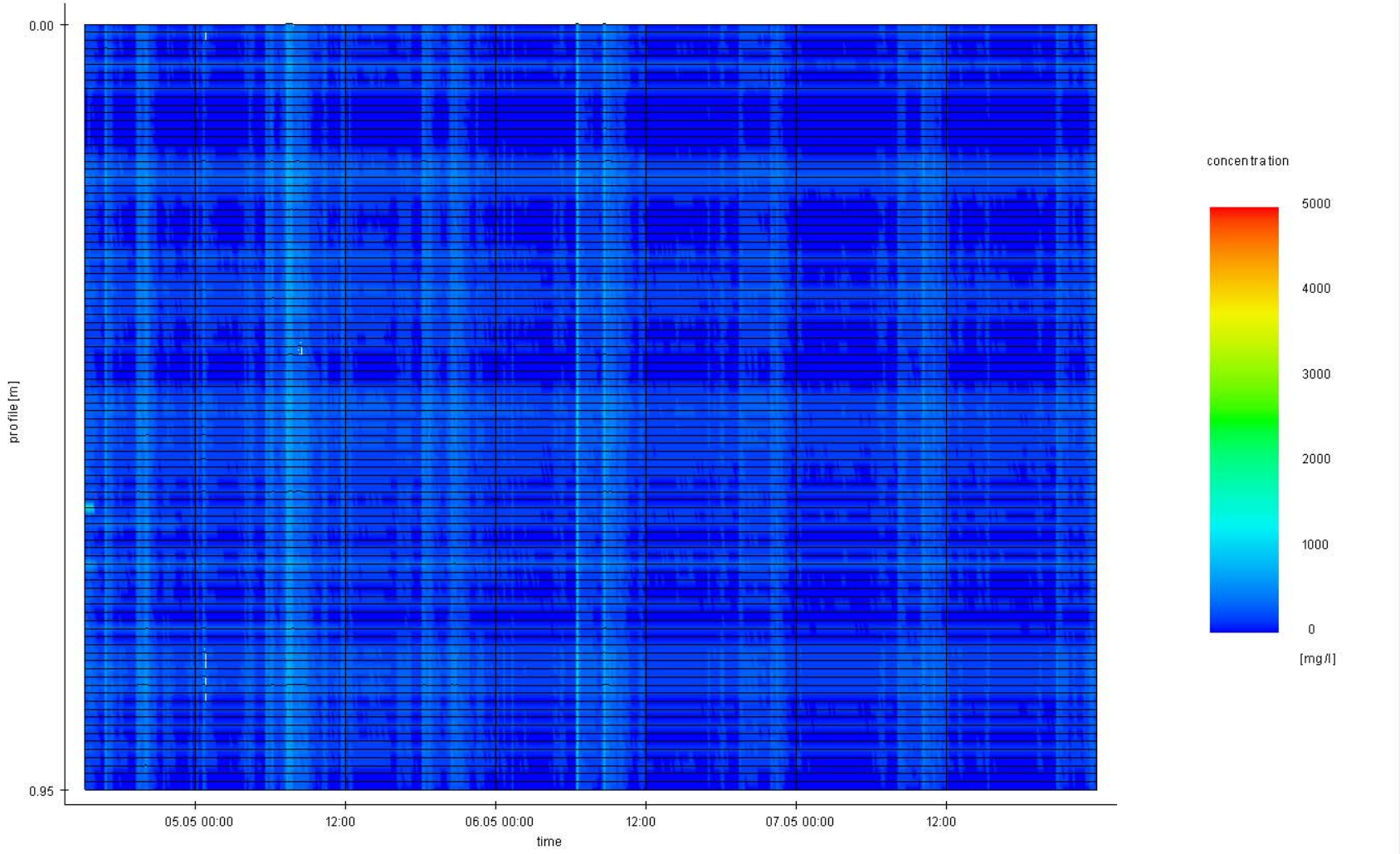
Date:
01/05/2006 – 04/05/2006

Data processed by: IMDC

In association with: wl | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

Location:
Deurganckdok CDW

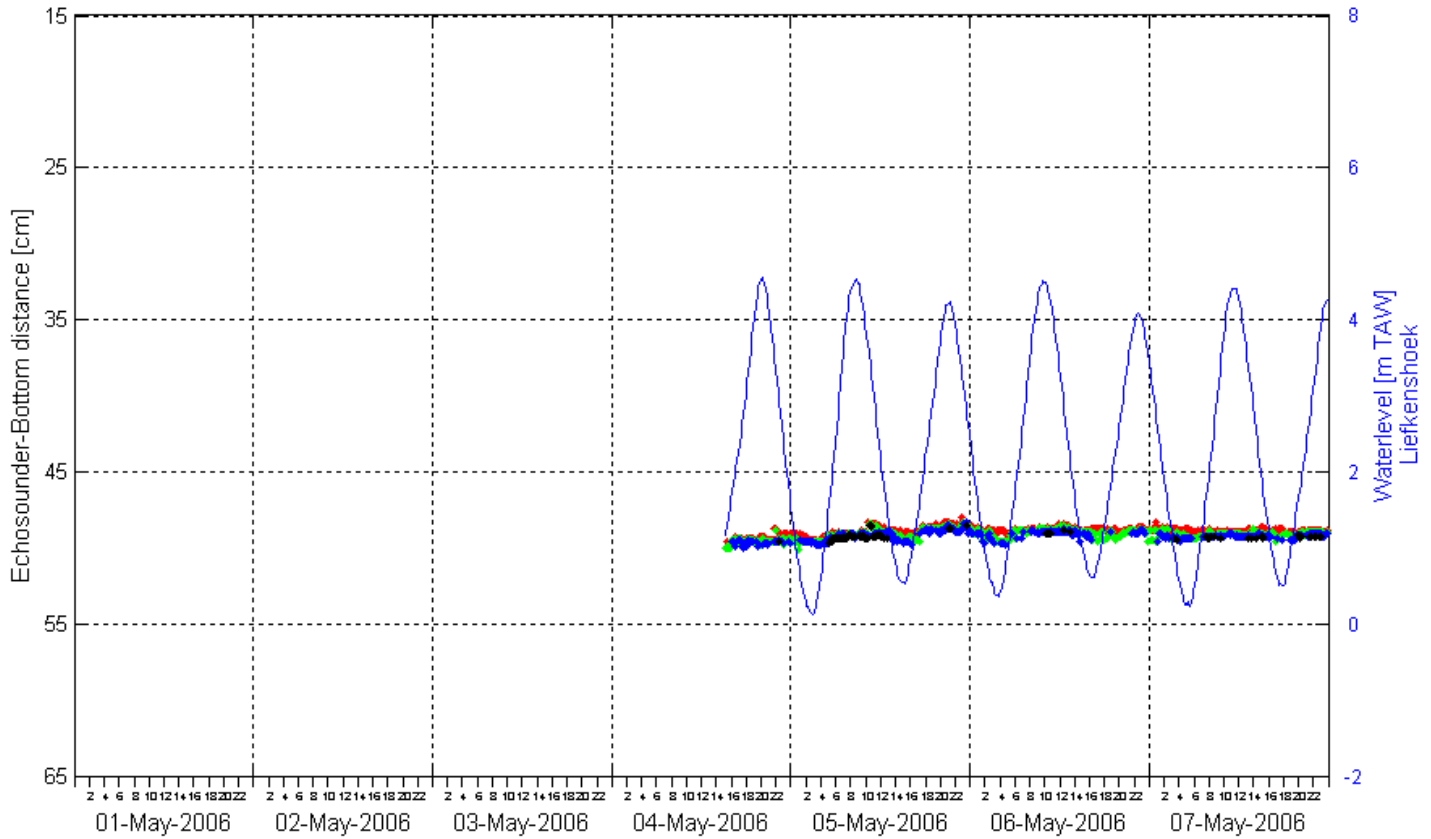
Date:
04/05/2006 – 07/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

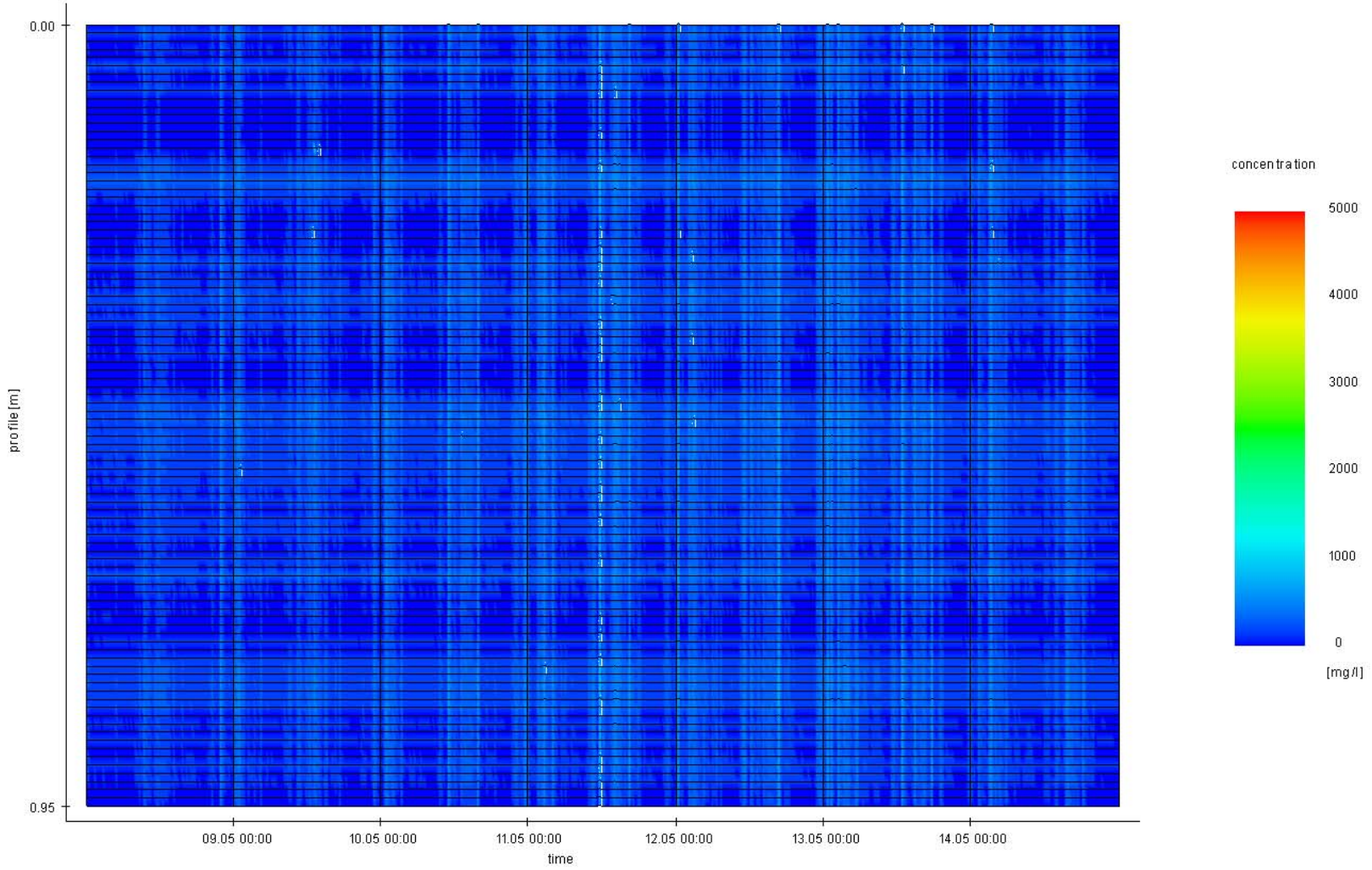
Date:
04/05/2006 – 07/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

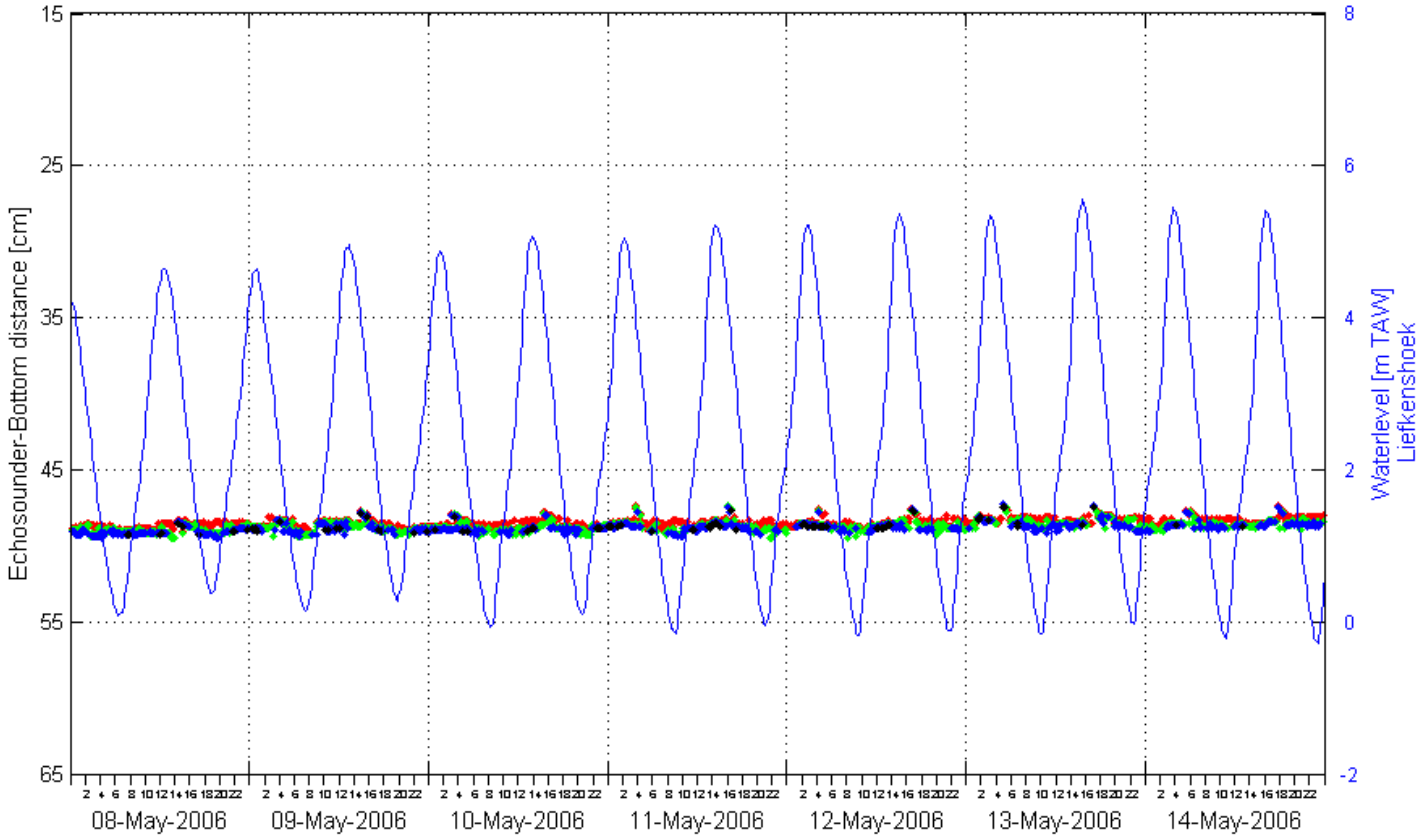
Location:	Date:
Deurganckdok CDW	08/05/2006 – 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

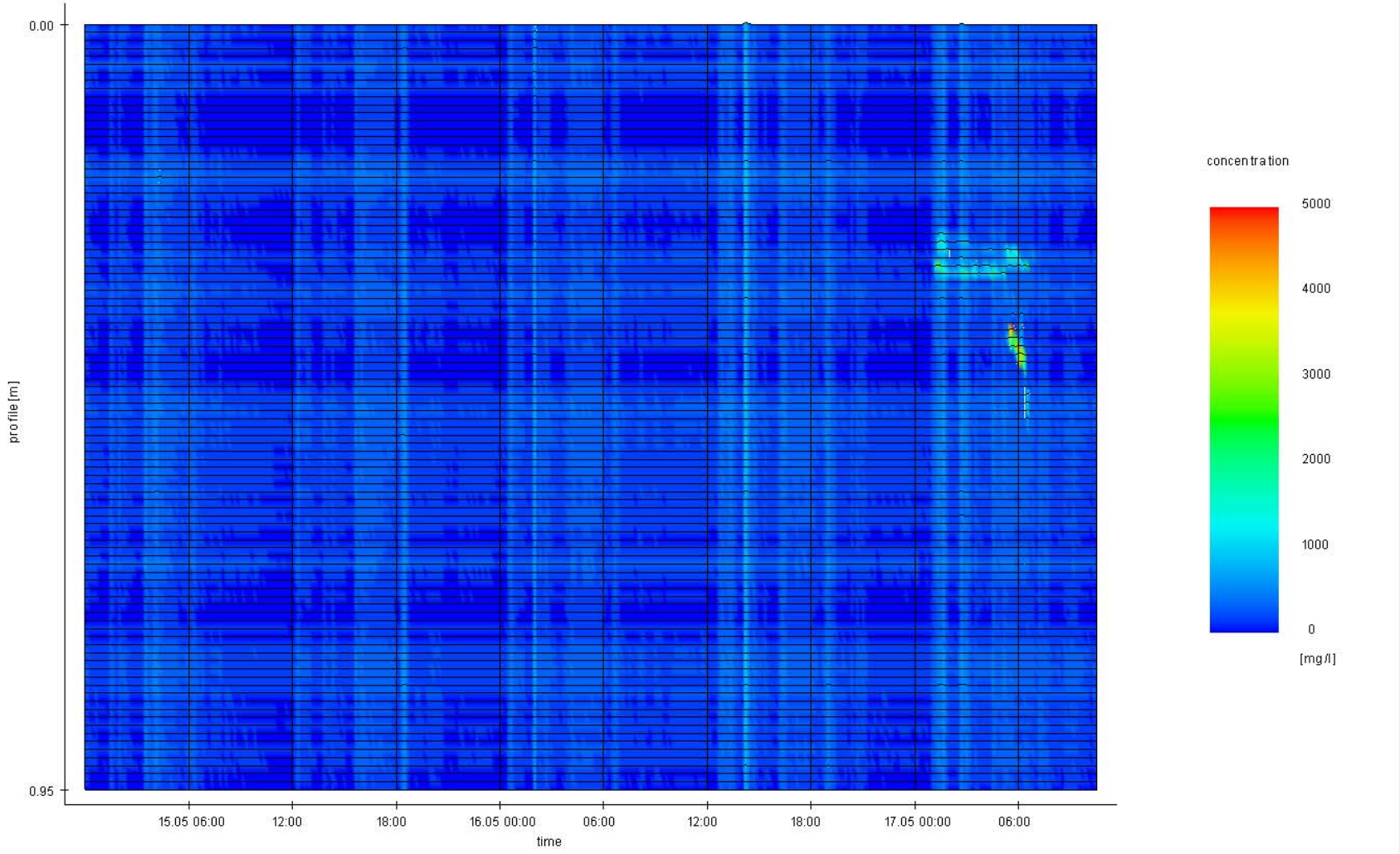
Date:
08/05/2006 – 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

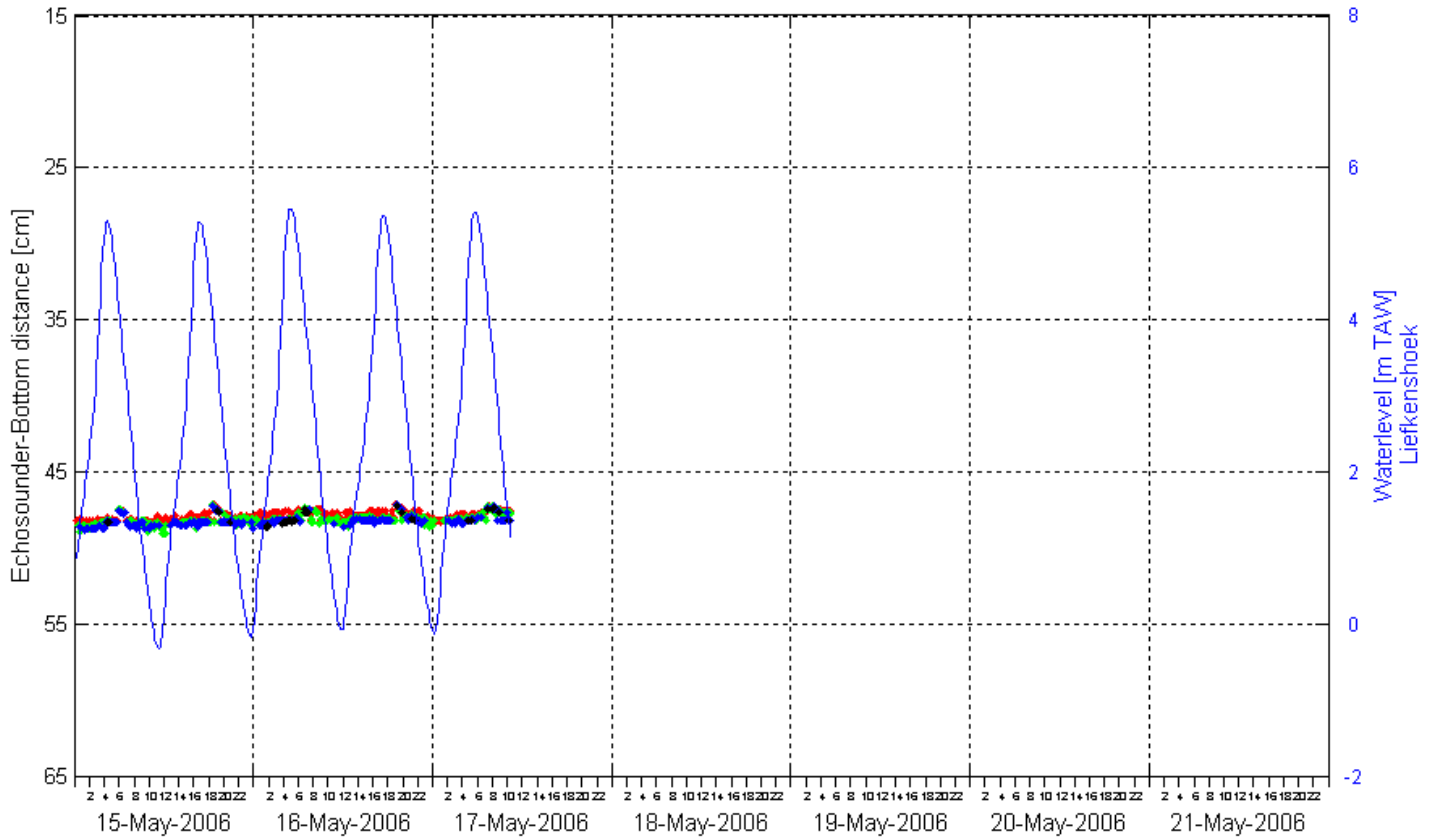
Location:	Date:
Deurganckdok CDW	15/05/2006 – 17/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

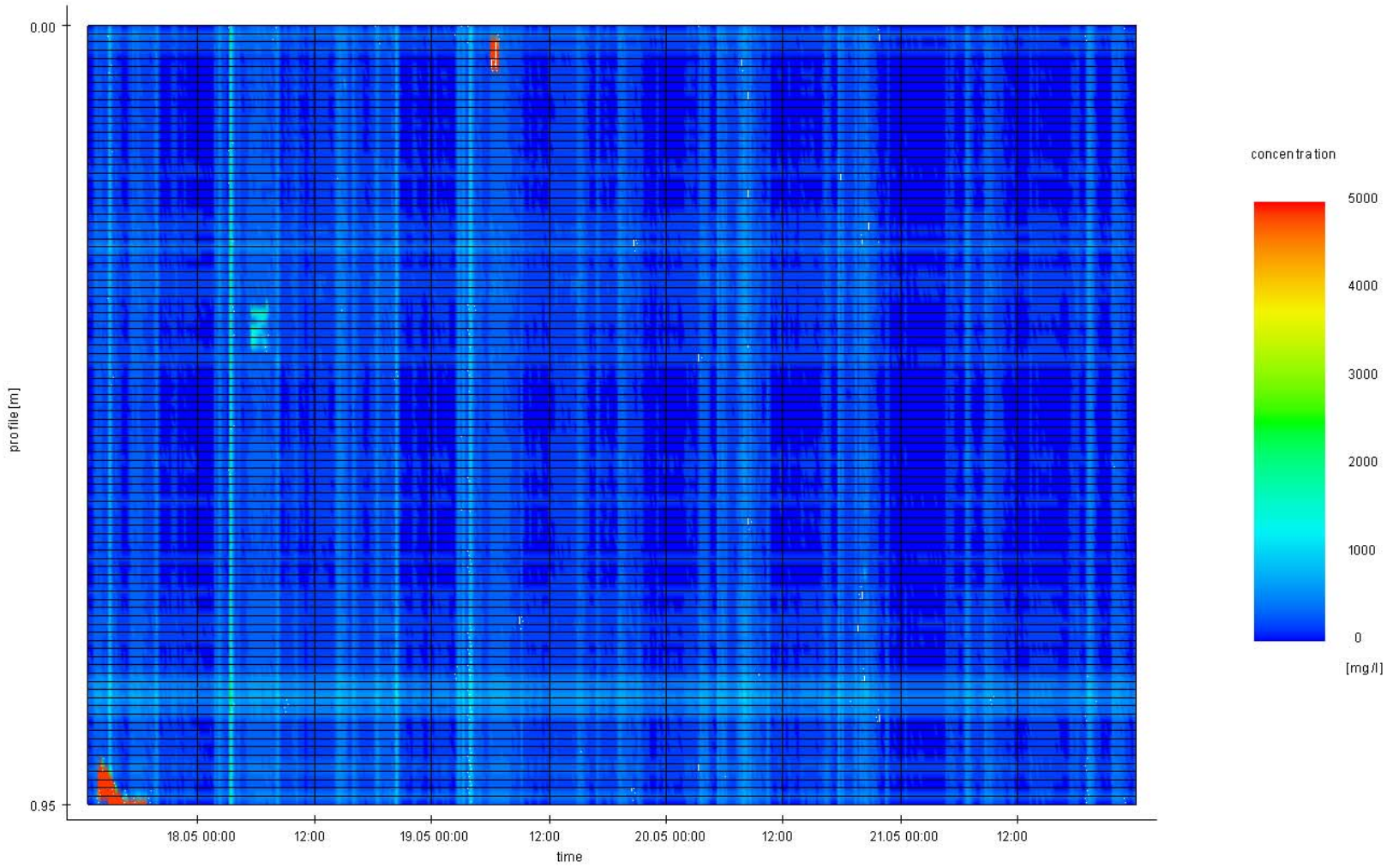
Date:
15/05/2006 – 17/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

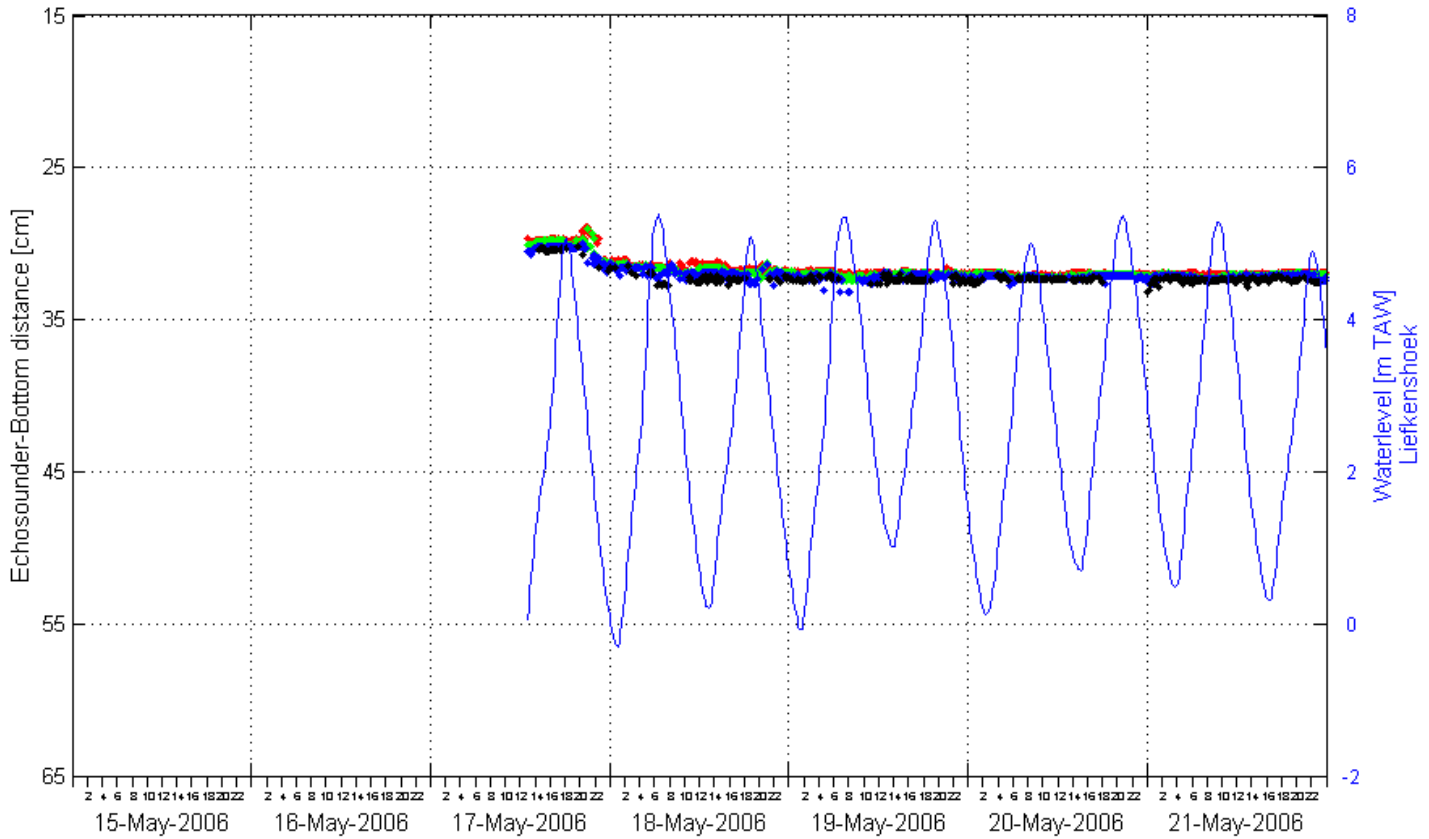
Location:	Date:
Deurganckdok CDW	17/05/2006 – 21/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

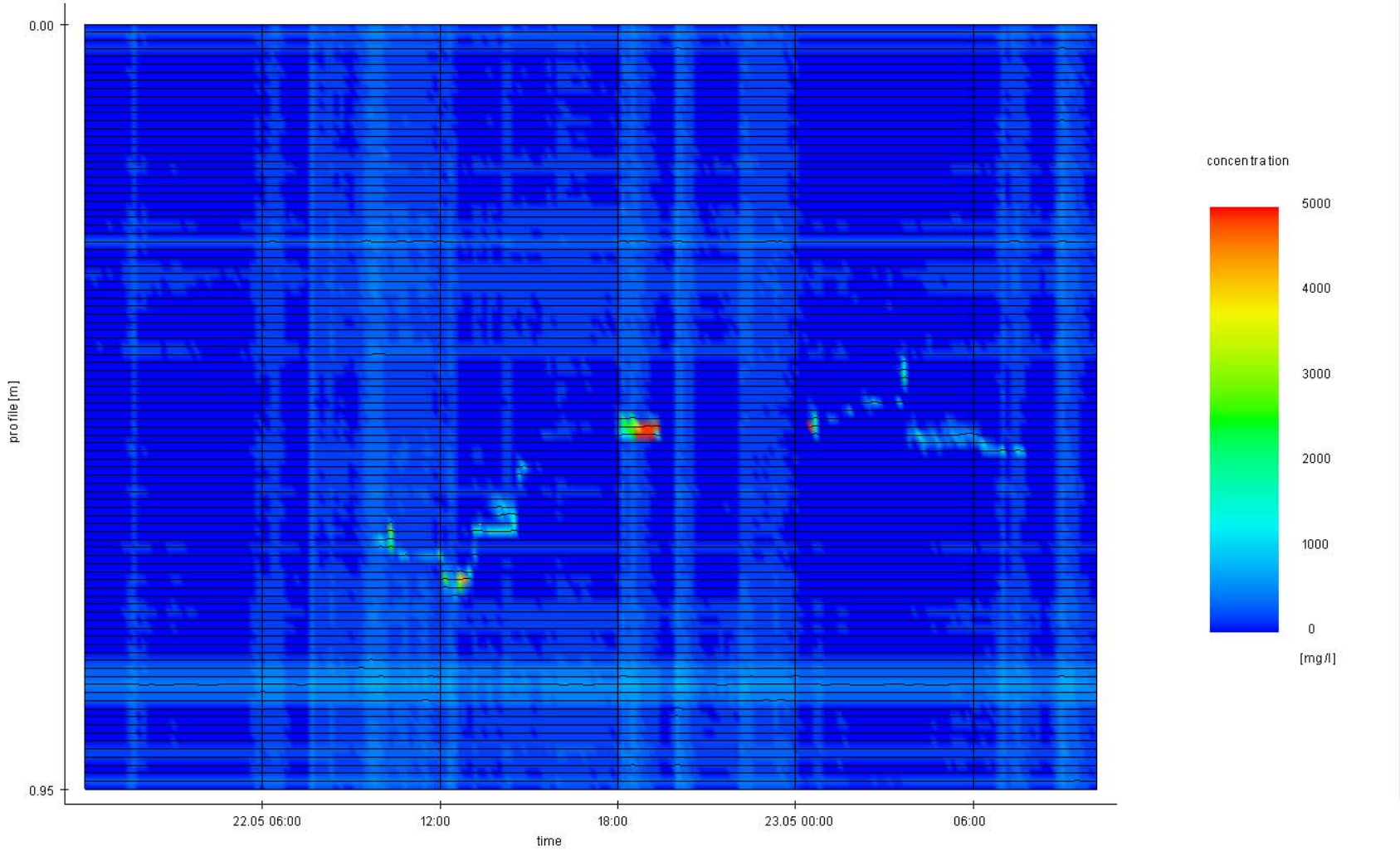
Date:
17/05/2006 – 21/05/2006

Data processed by: IMDC

In association with: wl | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

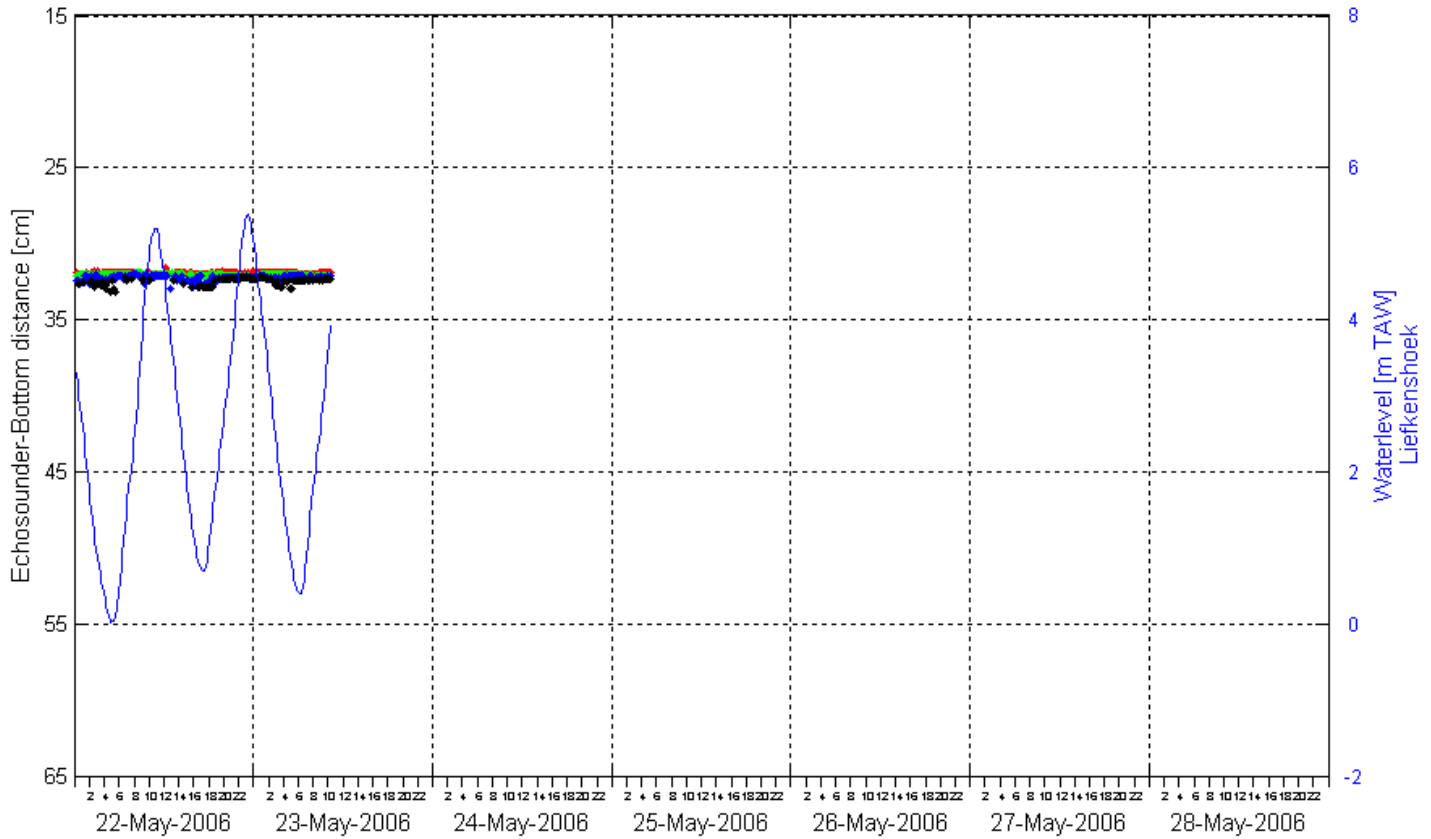
Location:	Date:
Deurganckdok CDW	22/05/2006 – 23/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

Date:
22/05/2006 – 23/05/2006

Data processed by: IMDC

In association with: wl | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060419	1	flood	3.8	225.4	224.8	265.4	250.5	258.4	286.8	218.5	217.9	231.1	249.4
20060420	1	ebb	4.9	117.4	116.4	159	138.7	145.9	176.7	114.5	115.9	127	137.6
20060420	2	flood	5	204.5	201.5	245.6	228.4	231.9	248.2	199.2	201.7	211	225.5
20060420	2	ebb	4.9	114.2	113.1	156.8	137.8	139.6	153.3	113	115.4	125.6	137.2
20060420	3	flood	4.4	160.4	157	200.8	181	183.2	198.3	155.7	158.2	168.7	180.5
20060421	3	ebb	4.6	111.7	113.2	155	136.2	137.9	150	113.5	117	125.6	136
20060421	4	flood	4.7	206.1	206.1	250	231.9	234.1	245.9	207.3	208	219.7	232.3
20060421	4	ebb	4.4	106.3	106.7	149.1	130.1	130.1	143.4	106.8	109.8	119.7	132
20060421	5	flood	4.1	127.4	127.4	168.7	149.2	150.2	163.1	128.2	145.2	150.7	150.2
20060422	5	ebb	4.3	74.1	74.9	114.3	94.6	94.4	106.8	74.5	76.9	85.6	94.2
20060422	6	flood	4.3	150.4	149.3	191.4	171.2	170.1	185.2	148.8	148.2	159.1	172.4
20060422	6	ebb	4.2	63.2	65.5	103.1	83.1	82.9	95.5	65.5	69.5	75.5	84.2
20060422	7	flood	3.8	95.3	96.8	137	115.2	116.9	129.1	98.4	100.6	108.5	119.1
20060423	7	ebb	4	59.7	60.8	98.8	78.3	78.8	89.2	63.5	66.3	71.5	82.2
20060423	8	flood	4.9	149.3	149.7	191.6	171.5	170.3	181.9	151.8	153.1	162	173
20060423	8	ebb	4.4	68.4	70.3	109.6	86.8	87.2	98	72.9	75.4	82.1	91.8
20060423	9	flood	4.2	119.3	121.1	163.2	140	140.1	150.8	121.5	123.7	133.1	142.9
20060424	9	ebb	4.8	57.4	59.9	97.3	75.6	75.5	84.5	61	65.1	70.6	79.8
20060424	10	flood	5	128.2	130.2	171.2	149.7	148.1	159.2	131.6	133.4	142.7	152.7
20060424	10	ebb	5	101.6	104	147.1	136.7	125.5	133	102.7	106.7	116.9	127.3

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060425	11	flood	4.9	156.6	157.6	200	178.6	176.4	188.3	158.2	159.3	171.1	183.1
20060425	11	ebb	5.3	85.9	88.8	130.5	106.1	105.7	116.7	89.5	95.2	101.7	111.3
20060425	12	flood	5.8	149.1	151	195.3	171.6	170.1	179.4	150.4	152.1	163.8	175
20060425	12	ebb	5.3	135.1	139.3	185	159.4	154.8	165.6	136.3	138.3	150	163.1
20060426	13	flood	5.3	261.3	265.3	312.4	289.6	286.9	299.4	264.3	265.5	280.3	294.8
20060426	13	ebb	5.6	116.9	120	163.9	139	136.2	146.5	119.8	124.1	134.5	145.2
20060426	14	flood	5.9	222.8	225.1	271	247	244	254.8	222.1	223.3	238.1	252
20060426	14	ebb	5.6	143.6	144.8	186.5	163.1	159.6	169.5	142	144.3	156.6	167.7
20060427	15	flood	5.5	399	409.2	463.3	446.8	443.4	458.4	427.5	429	449.2	469.2
20060427	15	ebb	6.1	127	129.6	173.7	150.2	147	155.9	136.1	135.3	145.6	157.7
20060427	16	flood	6.3	302.1	307.2	353.8	332.5	328	338.6	307.3	307.5	322.4	338.2
20060427	16	ebb	6	153.4	155.8	199.1	171.7	169.3	178.4	151.5	155.7	167.5	180.2
20060428	17	flood	5.8	248.5	253.9	297.1	274	270.7	280.8	253.1	254.5	265.8	282.2
20060428	17	ebb	6.2	165.2	170.3	212.6	187	182.7	190.2	166.5	168.6	181.5	195.6
20060428	18	flood	6.4	270	275.9	318.9	296.4	293.4	303.3	275.4	275.5	291.4	308
20060428	18	ebb	6	163.9	169.1	203.9	184.1	180.8	188.6	164.4	166	181.1	193.1
20060429	19	flood	6	355	361.8	403.1	388.5	383.3	393.9	362.1	364.9	382.2	399.3
20060429	19	ebb	6.2	173.2	177.6	213.3	198.2	195.7	202.7	180.6	181.6	195.7	209.5
20060429	20	flood	6.2	308.8	314.6	355.2	341	337.5	347.6	321.3	324.1	341.2	359.5
20060429	20	ebb	6	138.5	142.7	175.6	158.1	154	160.7	140.1	142.7	155.3	167.6
20060430	21	flood	5.9	234.4	239.5	274.1	255.7	252.9	261.1	236.7	237.7	252.2	266.7
20060430	21	ebb	6.1	140.7	146.1	178.2	161	157.3	164.6	143.6	146.5	158.3	171.1

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060430	22	flood	5.8	167.1	174.5	206.3	187.2	184.4	192.3	171.9	174.4	186	200.3
20060501	22	ebb	5.9	130	134.4	167.8	147.9	145.3	152.3	136.2	136.8	146.4	161.9
20060501	23	flood	5.7	145.2	151	182.4	163	158.8	168	147.2	150.9	161.4	172
20060501	23	ebb	5.9	131.1	138.9	170.5	151.3	148.2	154.8	137.7	141.1	151.7	163.7
20060501	24	flood	5.6	149.1	156.1	186.3	165.7	163.3	170.9	153.5	155.8	165.4	177.9
20060502	24	ebb	5.4	132.9	140.6	171	151.6	148.3	156.8	138.2	141.9	151.8	164.8
20060502	25	flood	5.7	141.2	148.5	178	156.9	155.9	163.2	145.9	149.5	158.8	170.8
20060502	25	ebb	5.3	135.9	143.4	174.3	151.8	149.4	156.3	138.4	141	154.4	166.6
20060502	26	flood	5	170.7	179.2	209.8	188.9	186.8	194.9	177.2	180.4	191.5	204.9
20060503	26	ebb	5.4	107.6	115.4	146.3	124.7	122.6	129.4	114.9	116.1	127.3	139.3
20060503	27	flood	5.3	191.5	199.8	229.5	207.8	205.5	213.4	195.1	198.1	208.2	223.3
20060503	27	ebb	4.8	130	138.5	170.5	145.7	145	153.7	134.1	137.8	150.7	172.9
20060503	28	flood	4.9	219.1	232.1	263.4	243.5	243.3	250.5	230.7	233.8	249.1	265.1
20060504	28	ebb	4.9	111.2	121.1	150.5	128.3	129.1	136.9	120.1	122.3	135.9	145.5
20060504	29	flood	4.9	263.1	273.8	302.7	283.2	283.6	291.2	268.6	269.5	283.9	300.5
20060504	29	ebb	4.2	161.5	168.5	201.2	178.3	176.1	185.5	168.8	167.3	181.7	194.7
20060504	30	flood	3.1	283.6	188.7	317.5	314.3	258.9	365.8	310.1	306.6	358.1	259.3
20060505	30	ebb	4.4	204.9	110.6	233.9	230.6	176	285.5	218.8	214.1	273	178.9
20060505	31	flood	4.5	328.6	236.1	360.8	357.4	303	409.9	334.4	332.1	390.6	306
20060505	31	ebb	4	252	152.6	277.1	274.2	218.4	330.8	255.9	240.8	308.5	220
20060505	32	flood	3.8	269	173.6	298.3	294.8	240.2	351.8	275.2	254	330.3	246.2
20060506	32	ebb	3.9	205	109.1	228.4	223.7	169.3	282.2	209.5	188.9	261.9	178.3

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Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060506	33	flood	4.2	284	190.1	310.7	307	253.3	364.5	289.9	268.6	340.7	263.8
20060506	33	ebb	4	201	107.1	222.7	217	163.3	276.2	202.4	181.3	248.9	170.2
20060506	34	flood	3.5	224.2	128.7	246.3	242.1	187.4	299.3	225.4	201.6	271.1	193.2
20060507	34	ebb	3.9	166.8	76.5	184	176.8	125.7	235.5	163.9	146.1	210.3	130.7
20060507	35	flood	4.2	251.9	156.3	272.6	268.9	215.5	324.3	247.3	225.9	294.5	218.2
20060507	35	ebb	4	187.9	94.2	202.9	199.8	146.8	257.8	182.9	163.2	229.1	150.5
20060507	36	flood	3.8	215.4	121.3	231.8	229.4	174.5	286.3	210.4	191.2	257.4	180.8
20060508	36	ebb	4.2	166.3	76.1	179.1	176.1	122.4	234	161.4	139.1	206.8	128.9
20060508	37	flood	4.6	243.3	147.3	258.9	258.7	203.6	313.6	239	205.3	283.7	207.5
20060508	37	ebb	4.3	201	103.2	212.9	209.8	155.8	269.3	195.3	164.4	239.7	164
20060509	38	flood	4.3	240.7	148.1	256	253.9	200.2	309.4	235.4	204.3	280.3	207.3
20060509	38	ebb	4.5	215	121.6	229.8	229.7	175.8	286.9	212.4	182.4	258.2	186.1
20060509	39	flood	4.8	268.2	176.5	282.1	282.6	225.4	334.5	260	226.1	303.5	233.7
20060509	39	ebb	4.7	219.4	130.3	232.2	225.4	174.5	287.4	211.8	181.5	257.8	186.6
20060510	40	flood	4.6	280.4	188.9	293.1	289.8	238.4	348.2	269.8	242	318.2	246.6
20060510	40	ebb	5	211.1	116.6	219.4	214.7	162.7	275.1	200.1	172	246.6	174.5
20060510	41	flood	5.2	285.9	191.1	296.3	293.2	241.7	351.6	274.3	243.9	319	250
20060510	41	ebb	5	233.2	138.1	241.3	237.1	185.1	297.6	223.2	192.3	267.9	195.9
20060511	42	flood	5	308.5	214.3	320.1	317.6	267.3	377.5	301	270.6	347.1	280
20060511	42	ebb	5.3	252.9	158.5	261.2	258.2	206.5	319.3	245.1	213.6	291.1	222.3
20060511	43	flood	5.4	356.1	262.7	368.2	365.4	310.6	420.1	344.1	310.8	388	322.3
20060511	43	ebb	5.3	262.2	166.7	268.1	262.7	210.7	320.6	247.7	216.4	290.4	221.9

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Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060512	44	flood	5.3	320.9	227.6	330.7	327.3	274.9	382.1	309.8	277.5	351	285.5
20060512	44	ebb	5.4	257	159.2	259.1	255.9	203.1	313.4	244.7	210.5	283.9	218
20060512	45	flood	5.5	312.1	217.3	319.6	317	262.6	370.9	300.1	266.9	340.2	275.1
20060512	45	ebb	5.5	288.6	192.2	292.9	285.7	230.8	339.8	269.9	236.6	310.6	244.1
20060513	46	flood	5.5	392.5	303	406.5	402.2	348.3	456.4	383.2	350.6	426	363.5
20060513	46	ebb	5.5	276.8	181.5	282	278.6	224.2	334.9	265.9	232.3	303.3	239.1
20060513	47	flood	5.7	336.4	242.4	344.9	340.1	284.3	392.8	323.9	288.5	361	296.9
20060513	47	ebb	5.5	257.3	163.5	262.4	257.1	204	312.6	247.5	212.5	285.3	221.2
20060514	48	flood	5.5	303.8	211.4	310.8	305.5	250.4	357.7	292.9	254.3	328.3	263.7
20060514	48	ebb	5.7	232.6	137	234.4	231.8	174.9	284.3	222	183.9	256	190.4
20060514	49	flood	5.6	286.1	193.4	291.4	285.8	229.4	338	274.8	236.5	307.9	243.2
20060514	49	ebb	5.7	219.9	128.6	223.8	216.4	163.8	270.8	214.5	174.8	245.8	178.4
20060515	50	flood	5.6	260.2	167.5	264.5	257.8	200.9	309.8	255.6	213.2	284.1	217.5
20060515	50	ebb	5.6	238.6	142.7	237.9	233.6	174.9	288.2	233.7	188.5	263.3	196.2
20060515	51	flood	5.6	260.4	166.7	262.5	257.8	198.1	308.2	255	210.5	283.1	215.9
20060515	51	ebb	5.5	244.3	150	244.2	241.5	182.8	293.3	239.1	194.9	270.6	205.7
20060516	52	flood	5.7	297.4	203.6	302.4	299	237	348.4	291.9	246.9	325.2	257.7
20060516	52	ebb	5.6	258	161.1	258.3	255.9	192.2	305.1	251.1	204	282.1	213.9
20060516	53	flood	5.5	342.2	250.1	349.2	346.6	282.8	393.1	335.6	290.5	369.9	302.6
20060517	53	ebb	5.5	246.6	152.6	250.5	248.5	184.6	296.4	244.2	200.6	281.2	212
20060517	54	flood	5.6	344.6	252.9	350	545.8	339	392.4	337	292.7	375.8	306.9
20060517	54	ebb	4.4	284.9	189.5	281	301.7	317.8	339	279.3	237.9	324.7	255.1

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Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*112-107**	*106-97*	*96-87*	*86-77*	*76-67*	*66-57*	*56-47*	*46-37*	*36-27*	*26-17*
20060517	55	flood	4.8	357.8	274.5	322.2	382.9	316	286.4	291.1	315.7	496.5	1343.1
20060518	55	ebb	5.5	257	165.4	208.6	268.4	205.3	174.3	182.6	208.5	394.5	334.4
20060518	56	flood	5.7	408.8	326.7	374.6	462.3	434.6	339.1	340.8	365.7	549.7	443.2
20060518	56	ebb	5.1	309.3	226.4	268.9	347.8	281.4	234	236.8	263	445.7	343.1
20060518	57	flood	4.9	371.8	295.6	342.3	397.6	331.7	310	309.4	334.5	515.9	411.6
20060519	57	ebb	5.2	270.9	187.5	230.3	289	221.9	196.5	205.6	231.5	417.2	309.2
20060519	58	flood	5.4	876.1	351.6	394.6	454.9	387.7	364.8	362.8	387.9	571.6	465.5
20060519	58	ebb	4.4	274.1	190.7	233	291.7	223.4	197.5	205.3	231.7	412.6	306.3
20060519	59	flood	4.3	317.4	238.3	278.7	338.7	270.5	247.6	251.8	276.7	458.9	353.7
20060520	59	ebb	5.2	230.5	144	184.8	241	175.6	151.7	161.4	186.2	369.5	259.7
20060520	60	flood	4.8	394.2	318.7	359.5	422.2	359.1	338.5	339	365.7	548.9	444.3
20060520	60	ebb	4.4	245.1	163.6	198.9	261.3	197.8	172.4	179.9	207.2	391.2	279.7
20060520	61	flood	4.7	351.3	277.8	316.8	376.7	314	290.5	294.8	320.6	498.1	391.1
20060521	61	ebb	4.9	182.6	100.1	132.7	191.8	133.3	111.1	119.6	146.8	328.2	212.8
20060521	62	flood	4.9	291.3	212.8	249.7	310.1	246.9	222.9	223.8	251.4	433.3	323.5
20060521	62	ebb	5	210.4	125.1	159.8	219.1	156.6	130.1	137.7	165.1	346.9	232.2
20060521	63	flood	4.6	288.7	214.1	249.3	308.3	247.5	226	229.1	254.2	435.6	325.8
20060522	63	ebb	4.9	174.1	95.3	126.3	183.2	125	101.9	109.9	135.3	320.5	200.5
20060522	64	flood	5.2	261.5	190.7	225.7	284.6	223.1	197.8	226.1	230.5	408.1	295.1
20060522	64	ebb	4.5	232.4	152.7	188.7	250.1	191.2	160.4	222.4	250.5	382.8	264.3
20060522	65	flood	4.8	265.8	190.2	225.4	283.1	221.2	338.6	177.6	212.9	415	294.6
20060523	65	ebb	5	162.1	84.5	114.9	165.2	121.7	152.7	79.7	108.2	309.9	179.7

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060419	1	HW	49.72	49.72	49.72	49.76
20060420	1	LW	50.21	50.38	50.42	-
20060420	2	HW	49.6	49.72	49.8	50.21
20060420	2	LW	50.01	50.01	50.05	50.09
20060420	3	HW	49.68	49.76	49.76	49.8
20060421	3	LW	49.93	50.09	50.42	50.71
20060421	4	HW	49.35	49.39	49.56	49.68
20060421	4	LW	49.84	49.84	49.88	49.97
20060421	5	HW	49.27	49.48	49.64	49.76
20060422	5	LW	49.84	49.84	49.97	50.01
20060422	6	HW	49.43	49.43	49.48	49.52
20060422	6	LW	49.72	49.76	49.84	49.88
20060422	7	HW	49.48	49.56	49.6	49.6
20060423	7	LW	49.76	49.76	49.84	50.05
20060423	8	HW	49.27	49.31	49.31	49.48
20060423	8	LW	49.76	50.01	50.09	-
20060423	9	HW	49.48	49.48	49.56	49.72
20060424	9	LW	50.26	50.3	50.38	50.46
20060424	10	HW	49.97	49.97	49.97	50.05
20060424	10	LW	49.97	50.13	50.21	50.46
20060425	11	HW	49.84	49.93	50.26	50.34
20060425	11	LW	50.01	50.09	50.17	-
20060425	12	HW	49.68	49.72	49.72	-
20060425	12	LW	49.64	49.72	49.8	50.13
20060426	13	HW	49.6	49.6	49.64	-
20060426	13	LW	49.35	49.43	49.48	49.64
20060426	14	HW	49.19	49.19	49.23	49.31
20060426	14	LW	49.02	49.15	49.15	49.27
20060427	15	HW	49.02	49.02	49.19	-
20060427	15	LW	48.82	48.9	48.94	-
20060427	16	HW	48.53	48.65	-	-
20060427	16	LW	49.6	-	-	-
20060428	17	HW	49.02	49.06	49.15	49.43
20060428	17	LW	48.9	48.98	49.06	49.15
20060428	18	HW	48.28	48.28	48.37	48.65
20060428	18	LW	48.33	48.37	48.61	-
20060429	19	HW	47.83	47.87	48.16	-
20060429	19	LW	47.67	47.96	48	48.08
20060429	20	HW	47.46	47.5	47.59	47.63

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060429	20	LW	48.24	48.28	48.28	48.41
20060430	21	HW	47.38	47.55	-	-
20060430	21	LW	47.63	47.67	48.37	-
20060430	22	HW	47.67	47.79	47.79	47.83
20060430	22	LW	47.87	48.33	48.53	-
20060501	23	HW	47.63	47.71	47.79	-
20060501	23	LW	47.87	47.91	48.04	-
20060501	24	HW	47.59	47.91	48.28	-
20060502	24	LW	47.91	48.08	48.16	-
20060502	25	HW	47.38	47.96	47.96	-
20060502	25	LW	47.91	48	48.04	48.41
20060502	26	HW	47.3	47.34	47.46	-
20060503	26	LW	47.46	48.2	-	-
20060503	27	HW	47.18	47.26	47.3	47.34
20060503	27	LW	47.71	47.79	48.12	48.2
20060503	28	HW	47.34	47.42	47.63	-
20060504	28	LW	47.46	47.55	47.67	47.75
20060504	29	HW	47.26	47.38	47.42	47.5
20060504	29	LW	49.97	50.09	50.21	-
20060504	30	HW	49.23	49.8	-	-
20060505	30	LW	49.56	49.56	49.64	-
20060505	31	HW	49.02	49.1	49.1	49.27
20060505	31	LW	48.9	49.15	-	-
20060505	32	HW	48.53	48.57	48.65	-
20060506	32	LW	48.82	49.52	49.68	-
20060506	33	HW	48.7	48.78	48.94	-
20060506	33	LW	48.86	48.98	49.06	-
20060506	34	HW	48.98	49.06	-	-
20060507	34	LW	48.78	49.31	49.43	-
20060507	35	HW	48.98	49.02	49.06	-
20060507	35	LW	48.98	49.35	49.43	-
20060507	36	HW	48.94	49.02	49.1	-
20060508	36	LW	48.94	49.06	49.15	-
20060508	37	HW	48.57	48.74	49.15	49.19
20060508	37	LW	48.94	49.19	-	-
20060509	38	HW	48.74	48.78	48.82	48.9
20060509	38	LW	48.7	49.35	-	-
20060509	39	HW	48.37	48.37	48.45	-
20060509	39	LW	48.86	48.94	49.27	-
20060510	40	HW	48.74	48.86	48.94	-

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060510	40	LW	48.61	48.9	-	-
20060510	41	HW	48.37	48.7	48.82	-
20060510	41	LW	48.82	48.94	-	-
20060511	42	HW	48.45	48.53	48.61	-
20060511	42	LW	48.7	49.06	49.31	-
20060511	43	HW	48.37	48.37	48.41	48.57
20060511	43	LW	48.78	49.1	-	-
20060512	44	HW	48.49	48.53	48.57	48.65
20060512	44	LW	48.7	49.35	-	-
20060512	45	HW	48.45	48.45	-	-
20060512	45	LW	48.04	48.86	-	-
20060513	46	HW	48.16	48.28	48.37	-
20060513	46	LW	48.24	48.7	-	-
20060513	47	HW	48.53	48.53	48.7	-
20060513	47	LW	48.2	-	-	-
20060514	48	HW	48.2	48.57	48.65	-
20060514	48	LW	48.28	48.61	48.74	-
20060514	49	HW	48.61	48.7	48.74	-
20060514	49	LW	48.12	48.53	48.7	-
20060515	50	HW	48.12	48.2	48.28	48.37
20060515	50	LW	47.91	48.33	-	-
20060515	51	HW	48	48.33	48.33	-
20060515	51	LW	47.96	48.28	-	-
20060516	52	HW	47.55	48.16	48.16	48.24
20060516	52	LW	47.96	48.28	-	-
20060516	53	HW	48.04	48.12	48.2	-
20060517	53	LW	48.12	48.24	-	-
20060517	54	HW	47.83	48	48.12	-
20060517	54	LW	29.98	30.06	30.14	-
20060517	55	HW	29.77	30.1	30.18	-
20060518	55	LW	31.29	31.45	31.49	31.54
20060518	56	HW	31.49	31.58	32.19	32.73
20060518	56	LW	31.37	31.58	31.91	32.15
20060518	57	HW	31.66	31.91	32.6	-
20060519	57	LW	31.86	32.03	32.31	32.4
20060519	58	HW	31.95	32.11	32.4	-
20060519	58	LW	31.91	32.03	32.23	32.4
20060519	59	HW	31.99	32.03	32.31	-
20060520	59	LW	31.91	31.99	32.31	-
20060520	60	HW	32.07	32.11	32.15	32.23

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060520	60	LW	31.95	32.07	32.23	32.36
20060520	61	HW	31.99	31.99	32.07	-
20060521	61	LW	32.03	32.07	32.15	32.23
20060521	62	HW	32.07	32.31	32.31	32.48
20060521	62	LW	32.03	32.07	32.31	32.36
20060521	63	HW	31.95	31.99	32.15	-
20060522	63	LW	31.95	31.99	32.4	-
20060522	64	HW	31.99	32.03	32.15	-
20060522	64	LW	31.99	31.99	32.15	32.73
20060522	65	HW	31.99	32.19	32.19	32.23
20060523	65	LW	31.95	32.03	32.07	32.4

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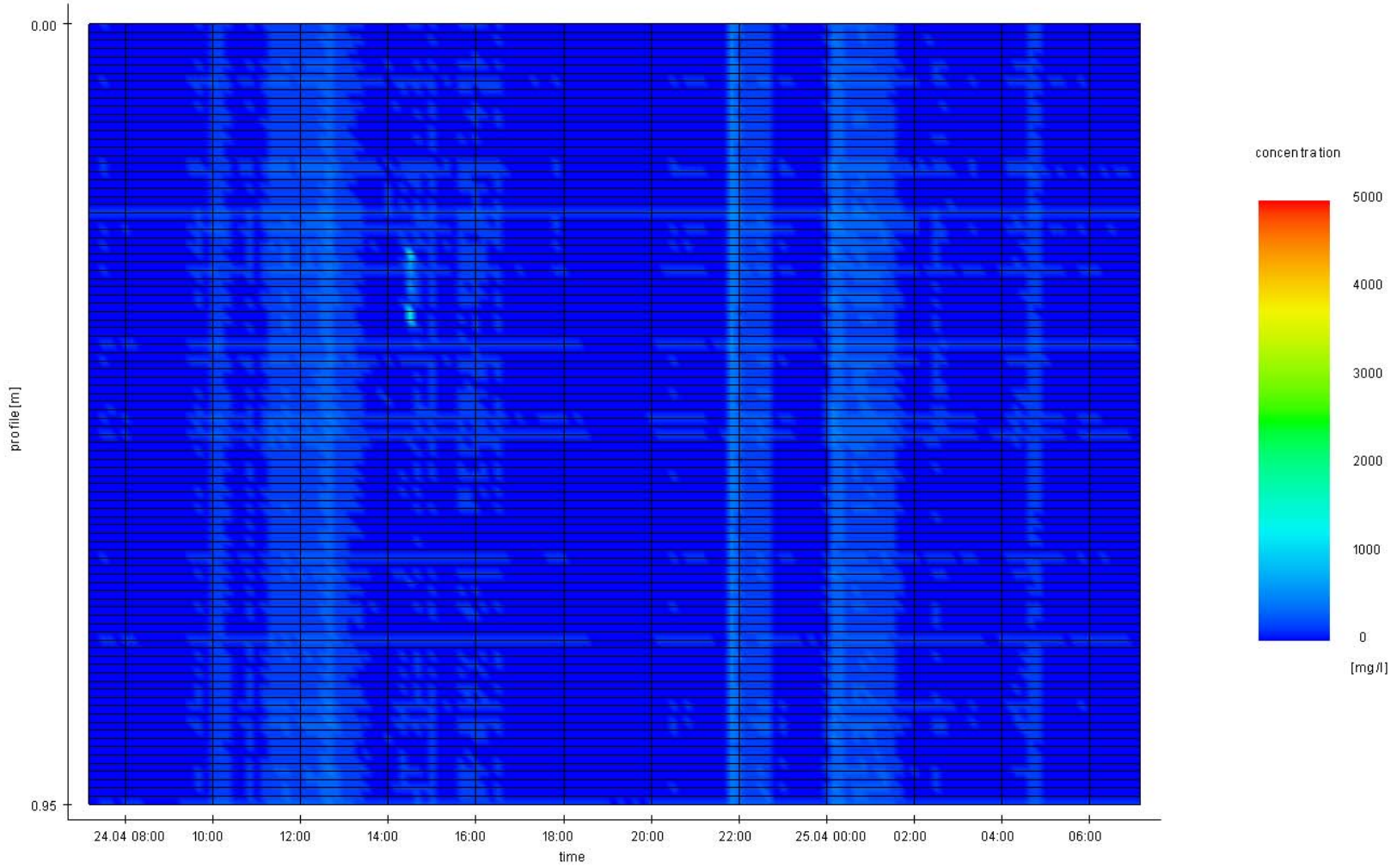
11283 Accretion Deurganckok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

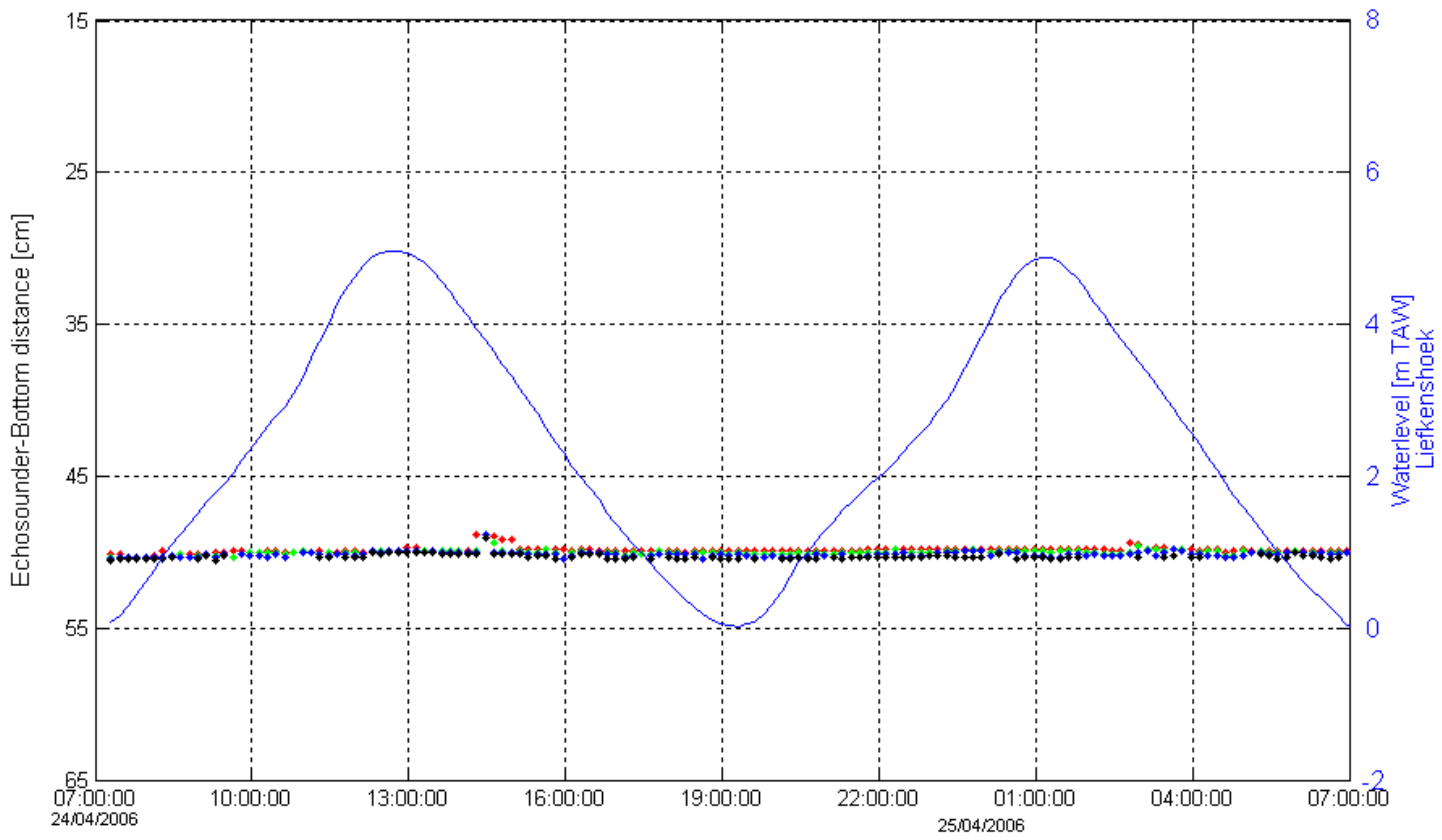
Location:	Date:
Deurganckdok CDW	Avg Tide 24/04 – 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok CDW

Date:
Avg Tide 24/04 – 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

C.2 Sill frame

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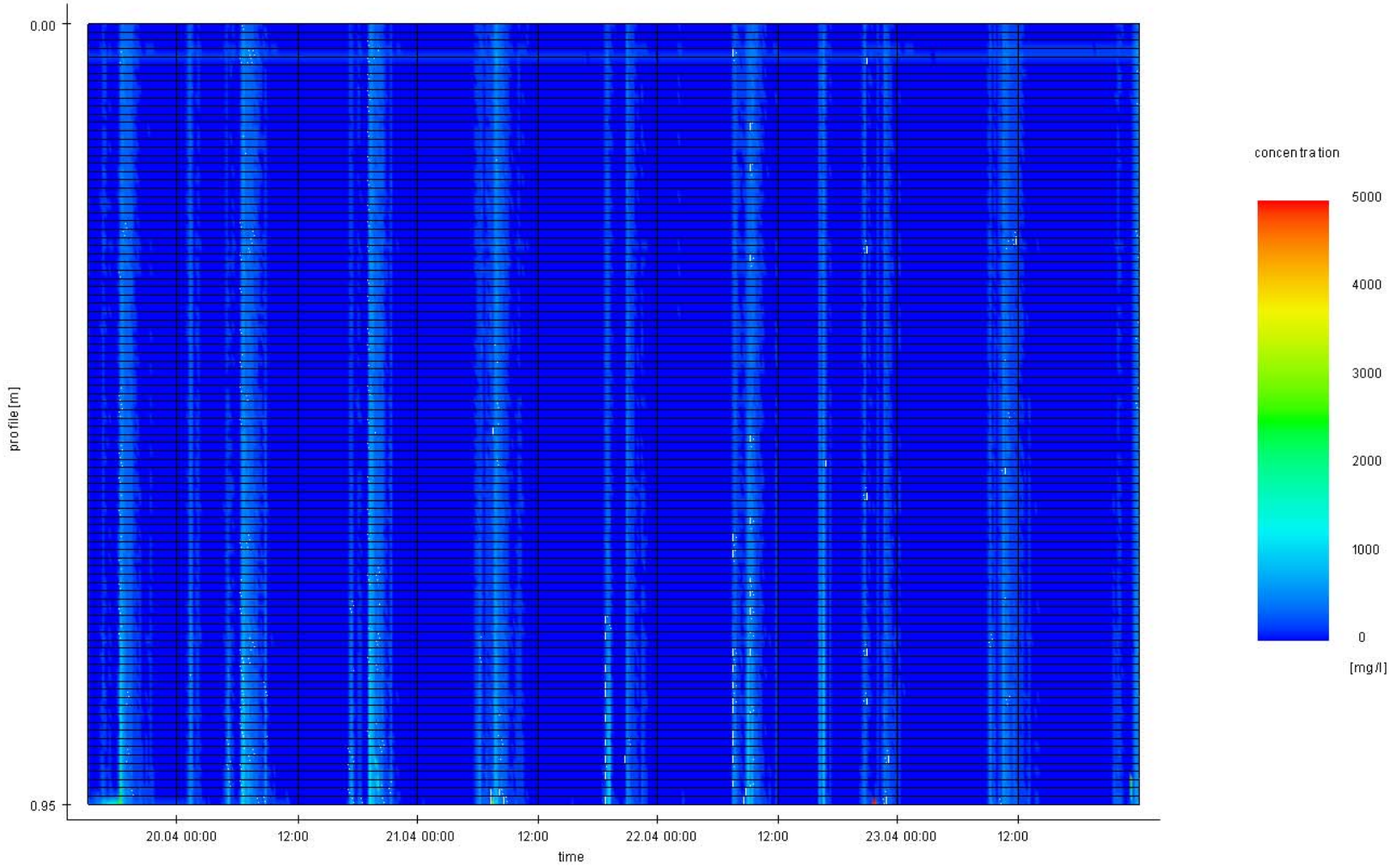
11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

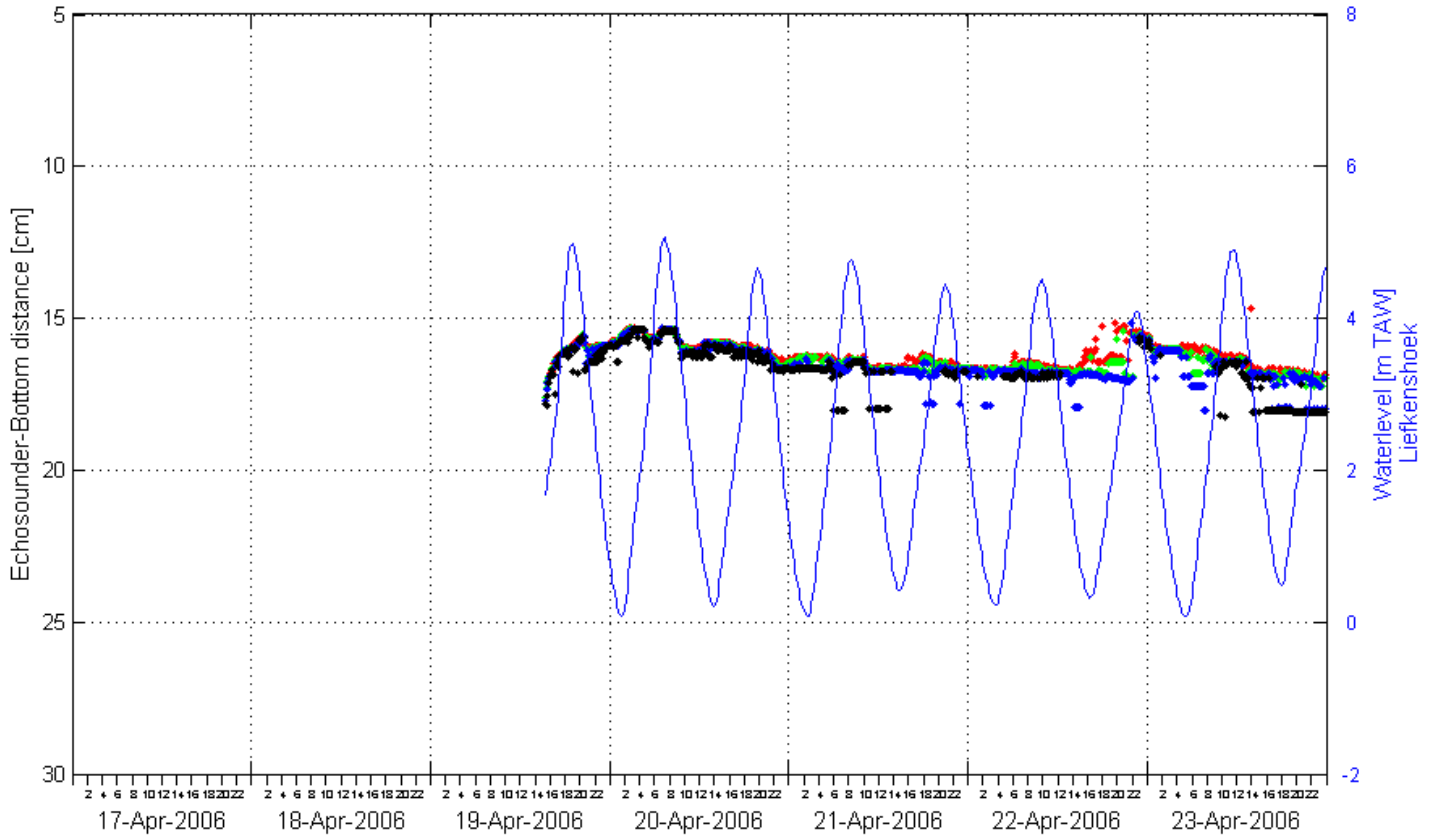
Location:	Date:
Deurganckdok Sill	19/04/2006 – 23/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

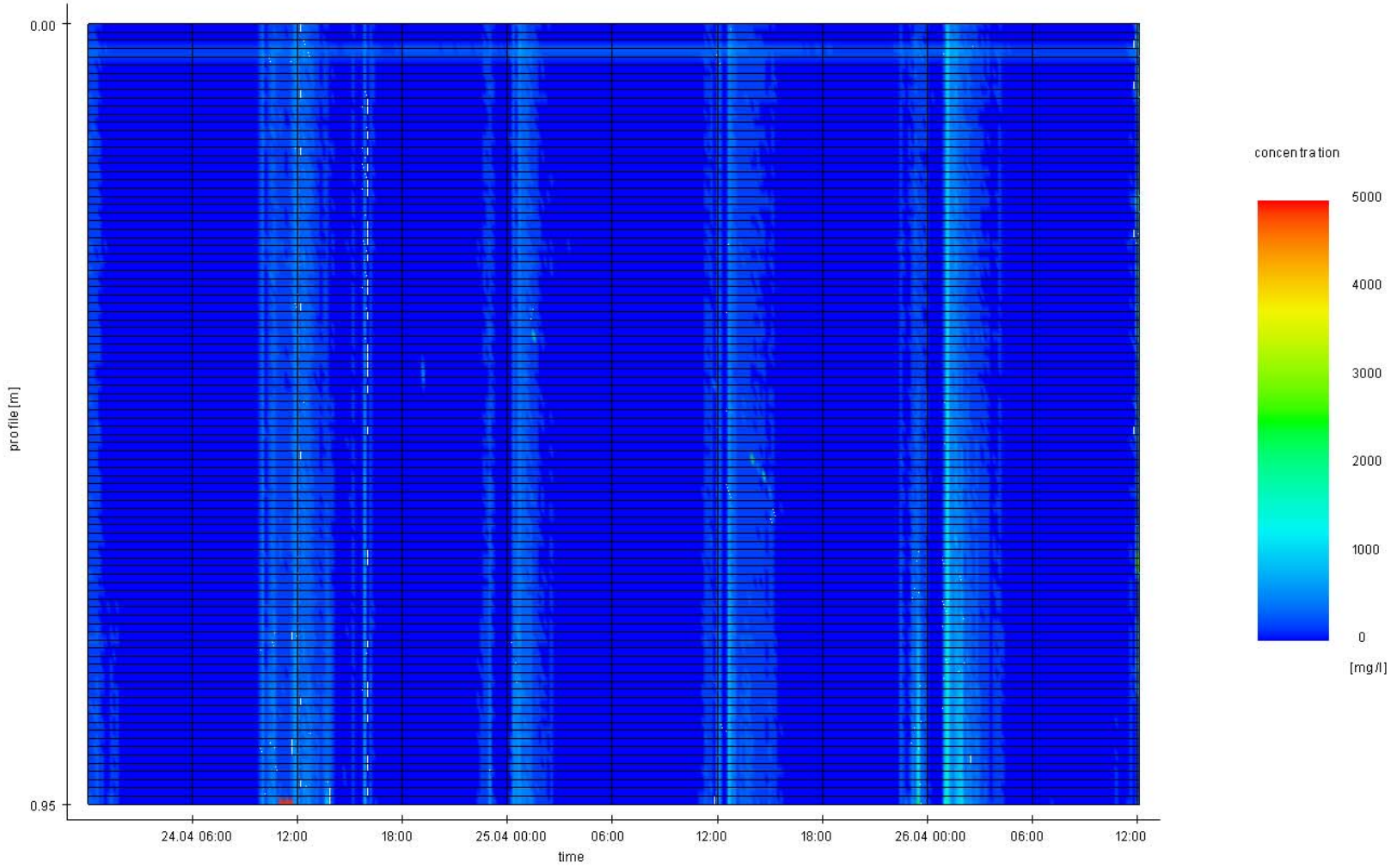
Date:
19/04/2006 – 23/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

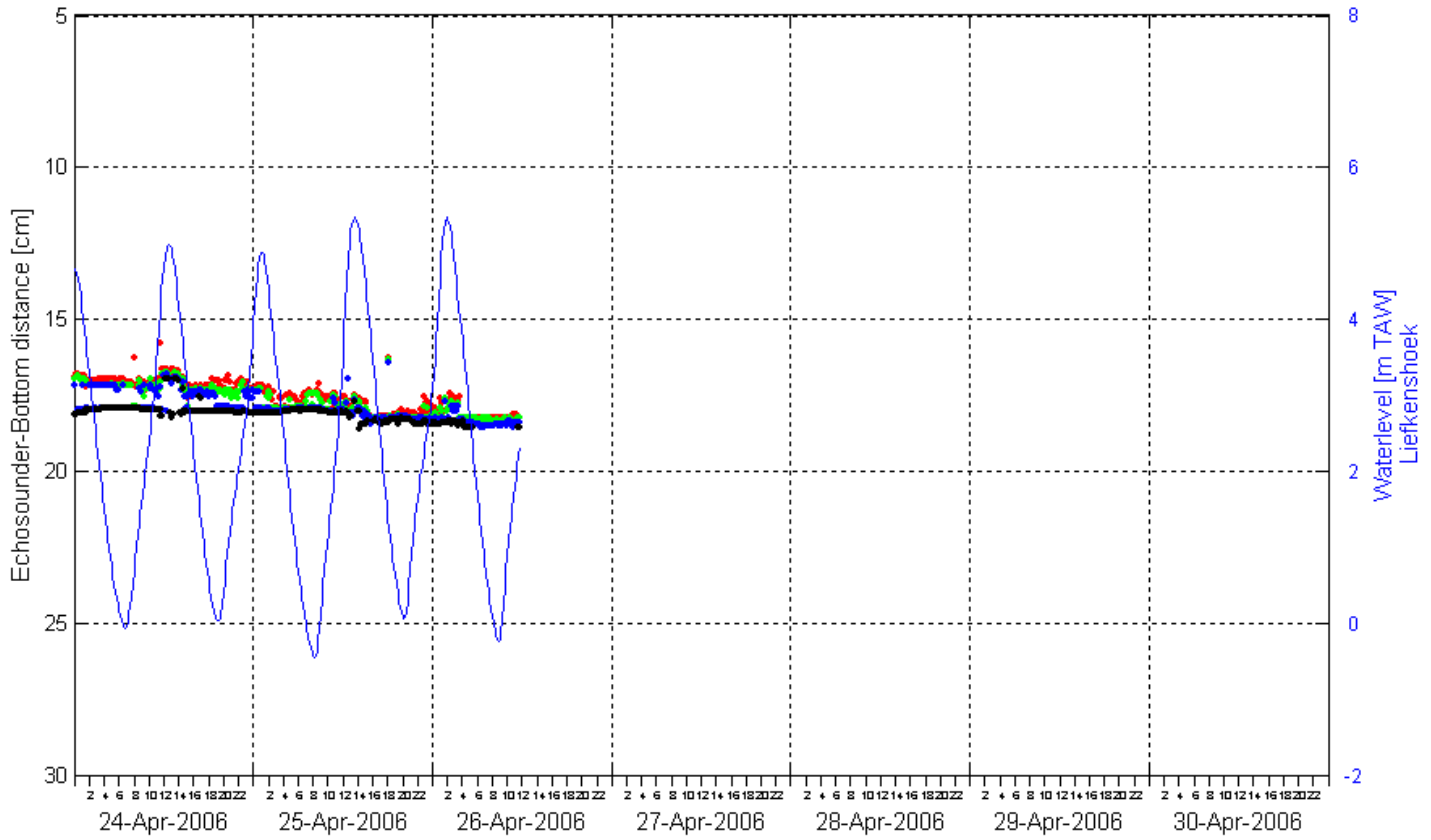
Location:	Date:
Deurganckdok Sill	24/04/2006 – 26/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

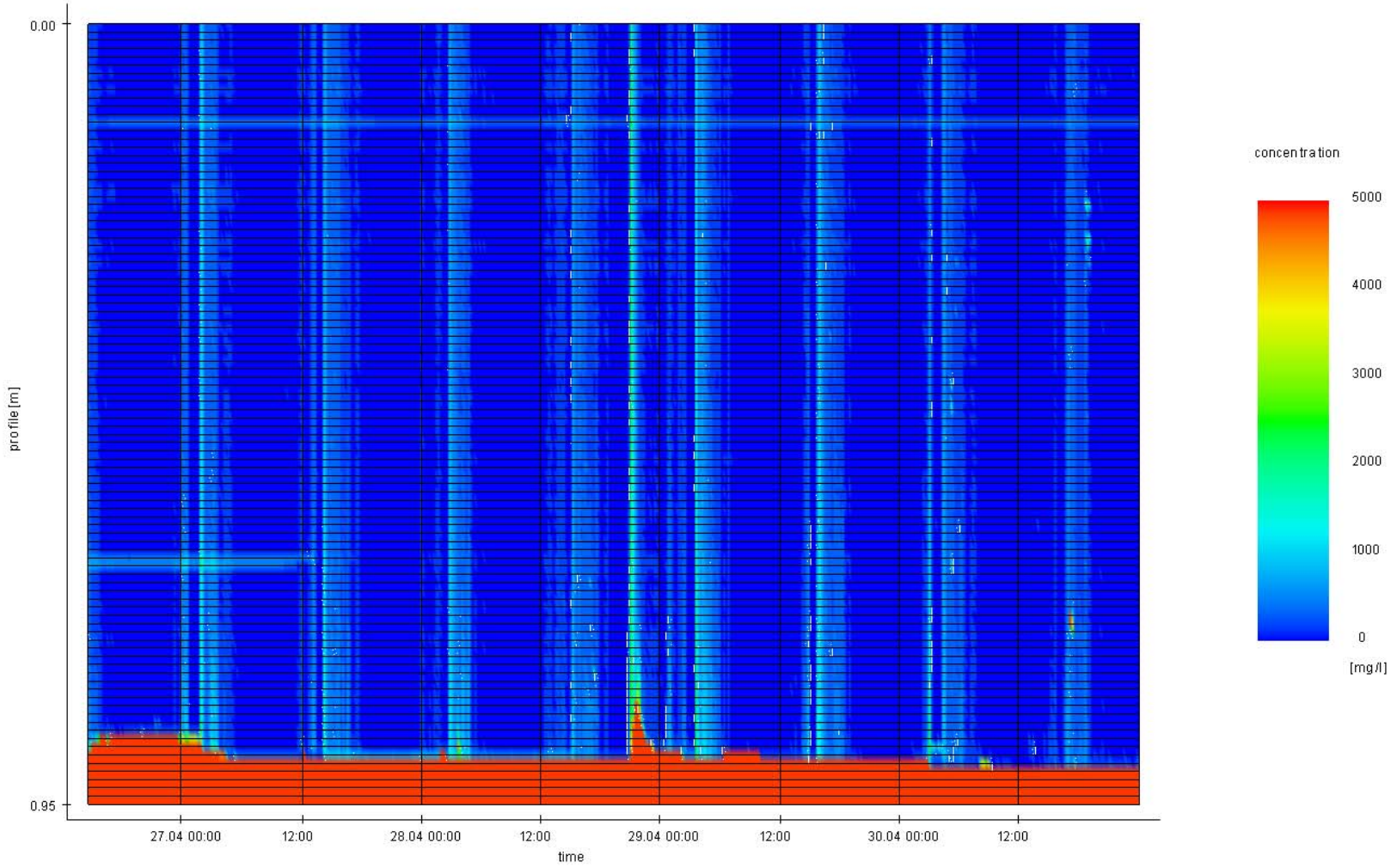
Date:
24/04/2006 – 26/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

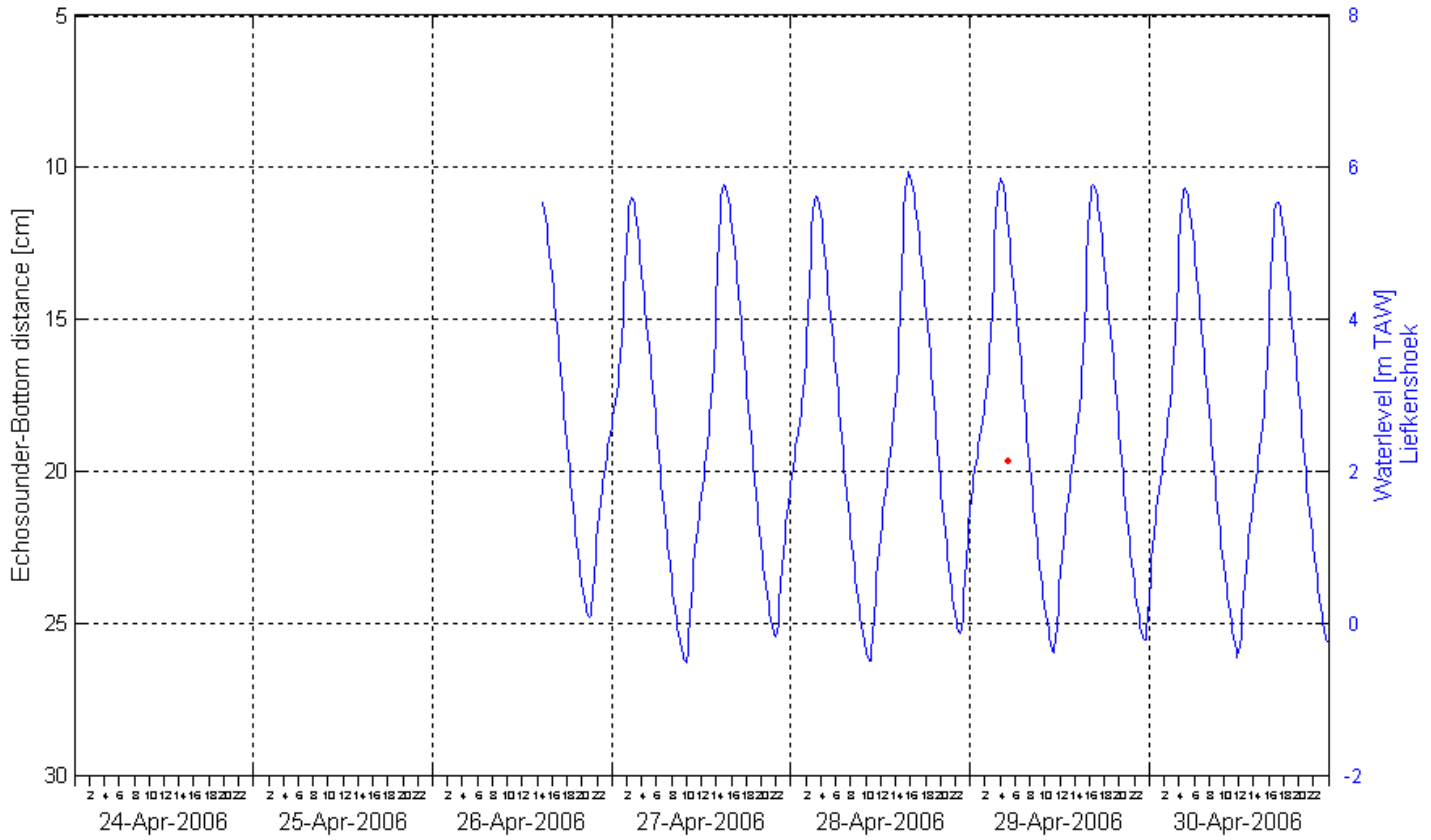
Location:	Date:
Deurganckdok Sill	26/04/2006 – 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

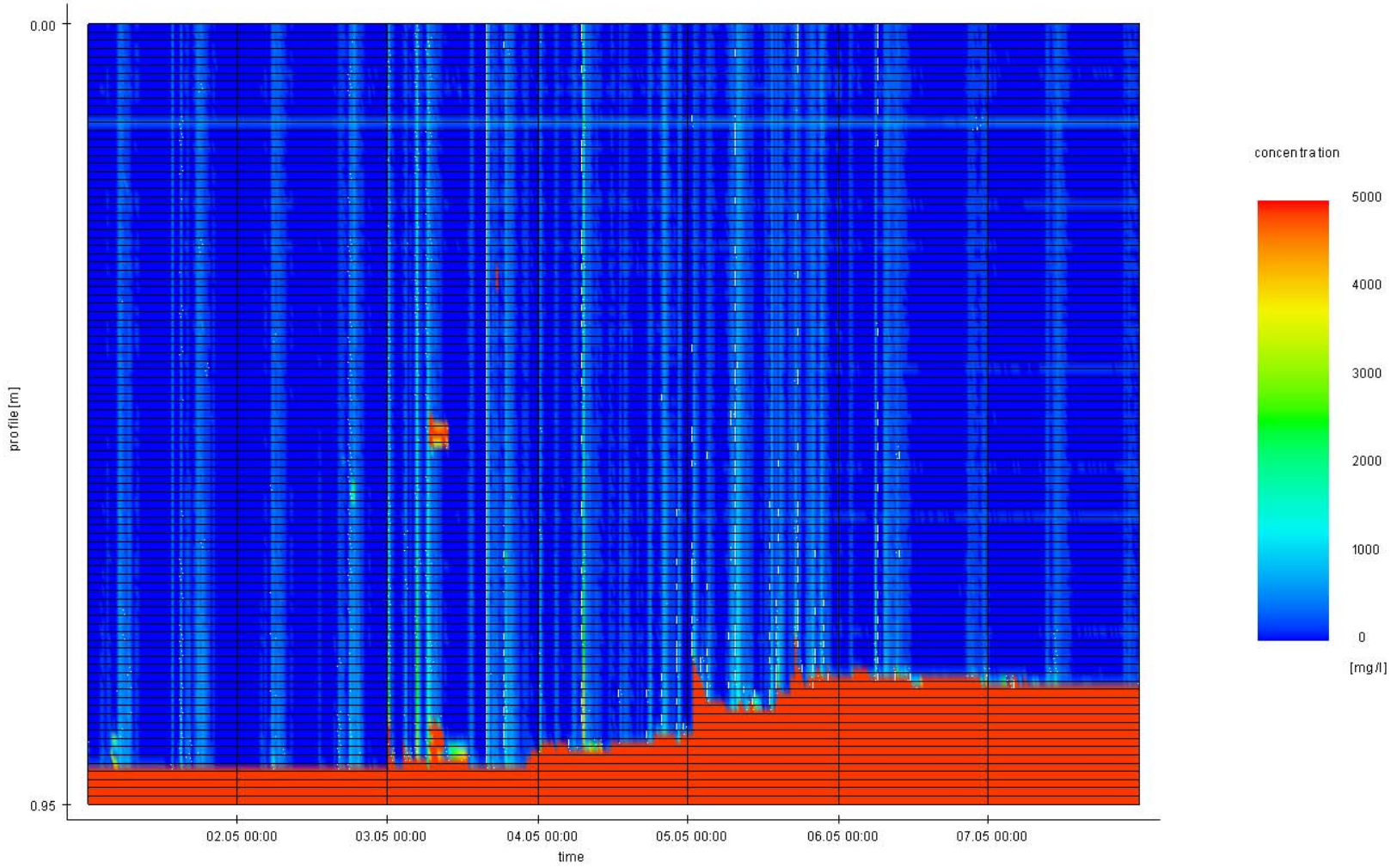
Date:
26/04/2006 – 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

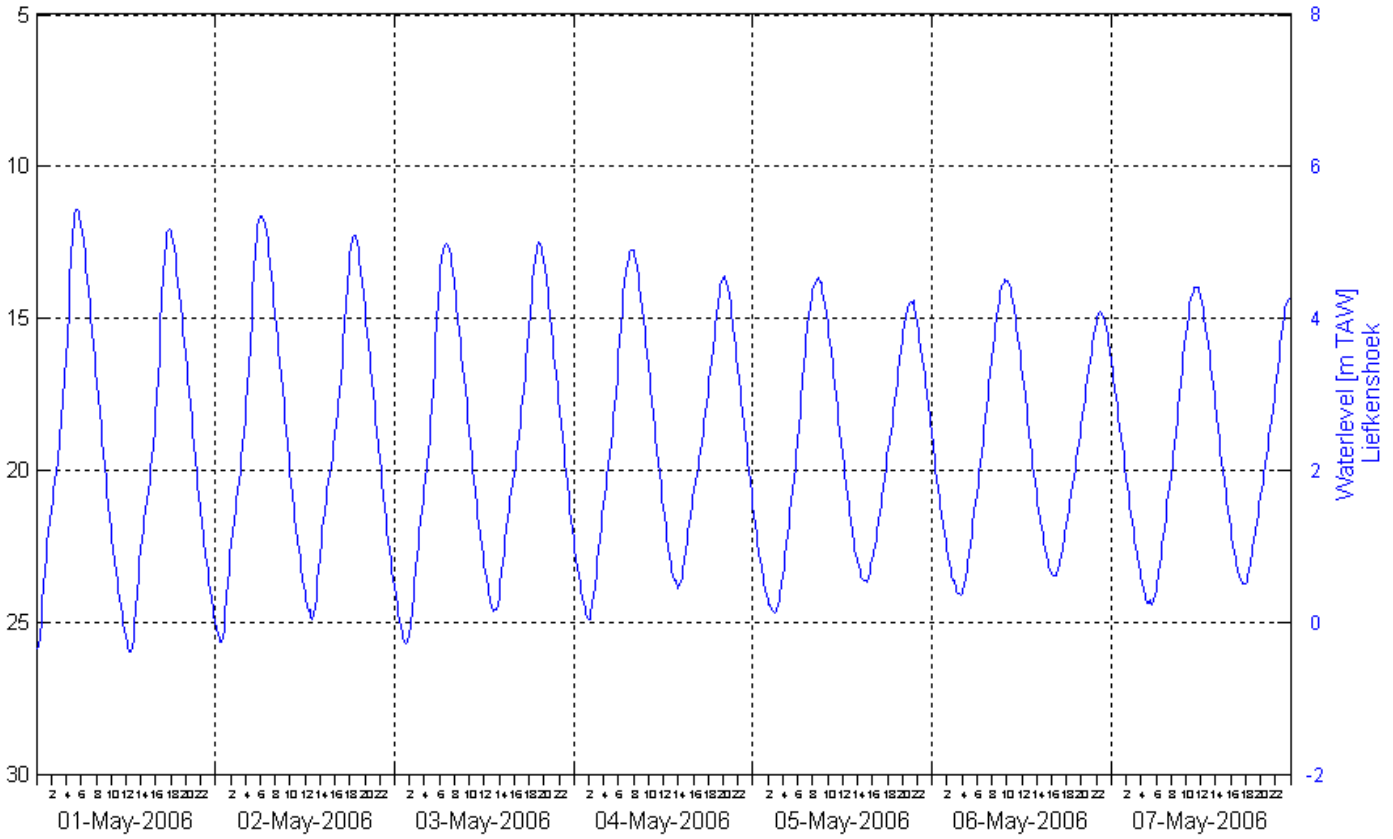
Location:	Date:
Deurganckdok Sill	01/05/2006 – 07/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

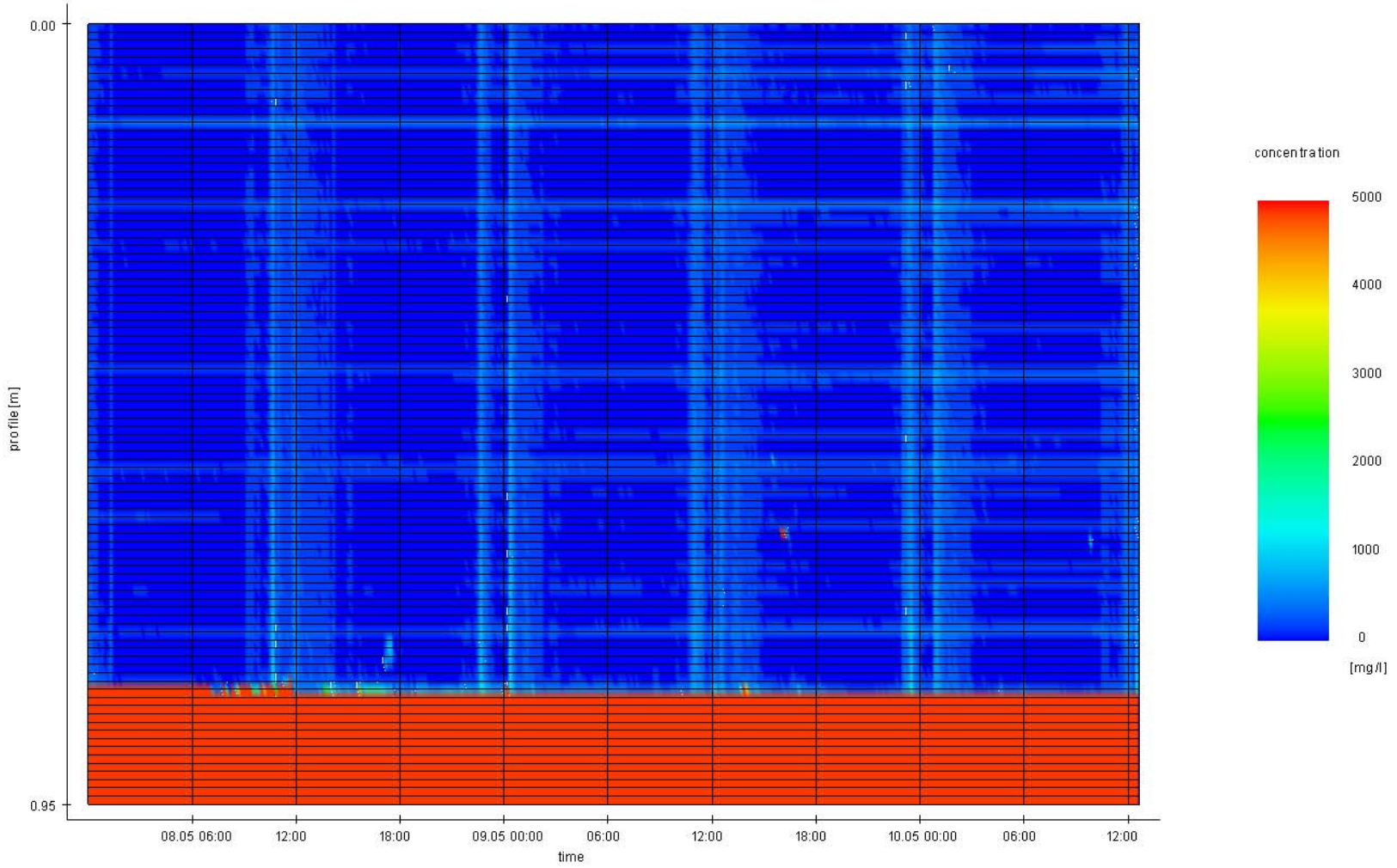
Date:
01/05/2006 – 07/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

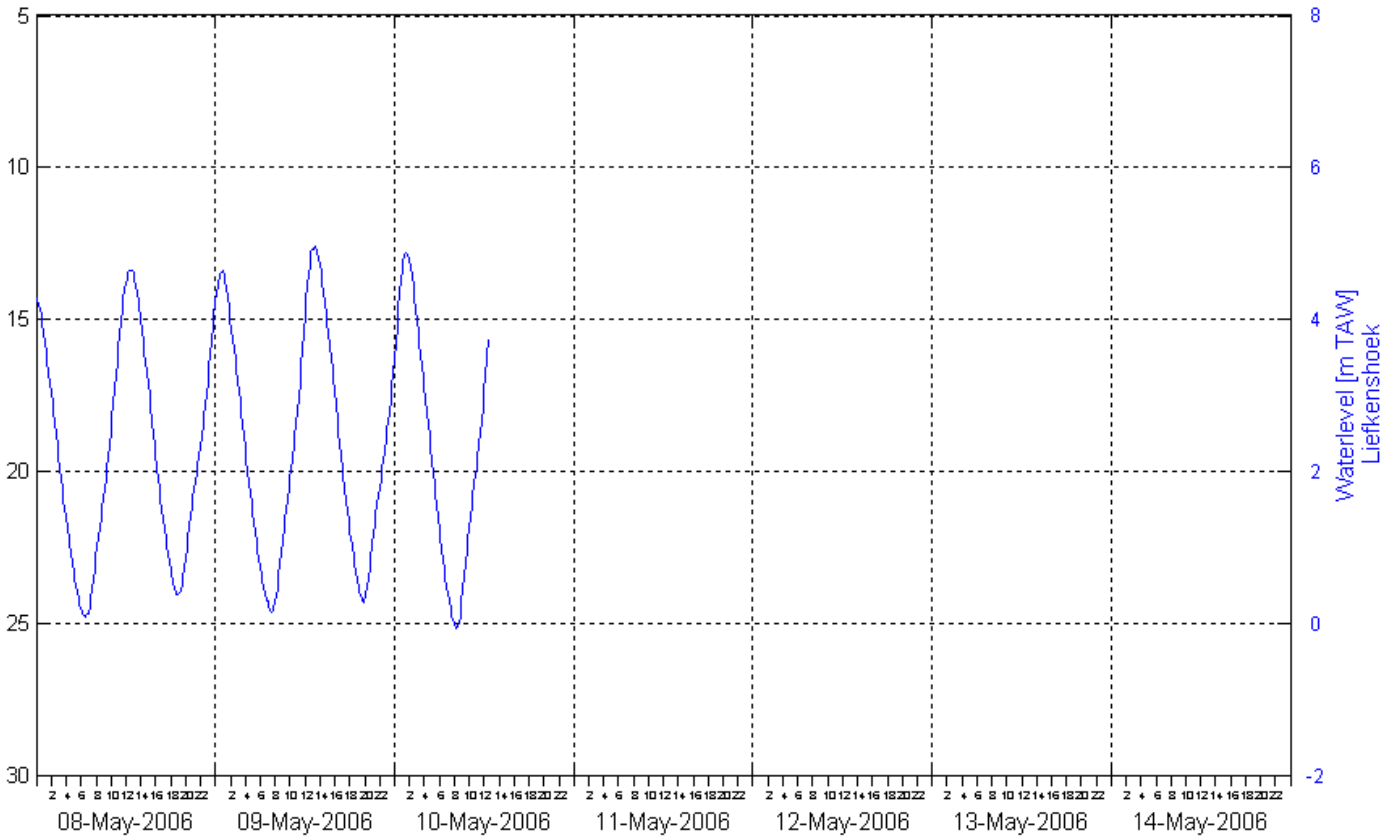
Location:	Date:
Deurganckdok Sill	08/05/2006 – 10/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

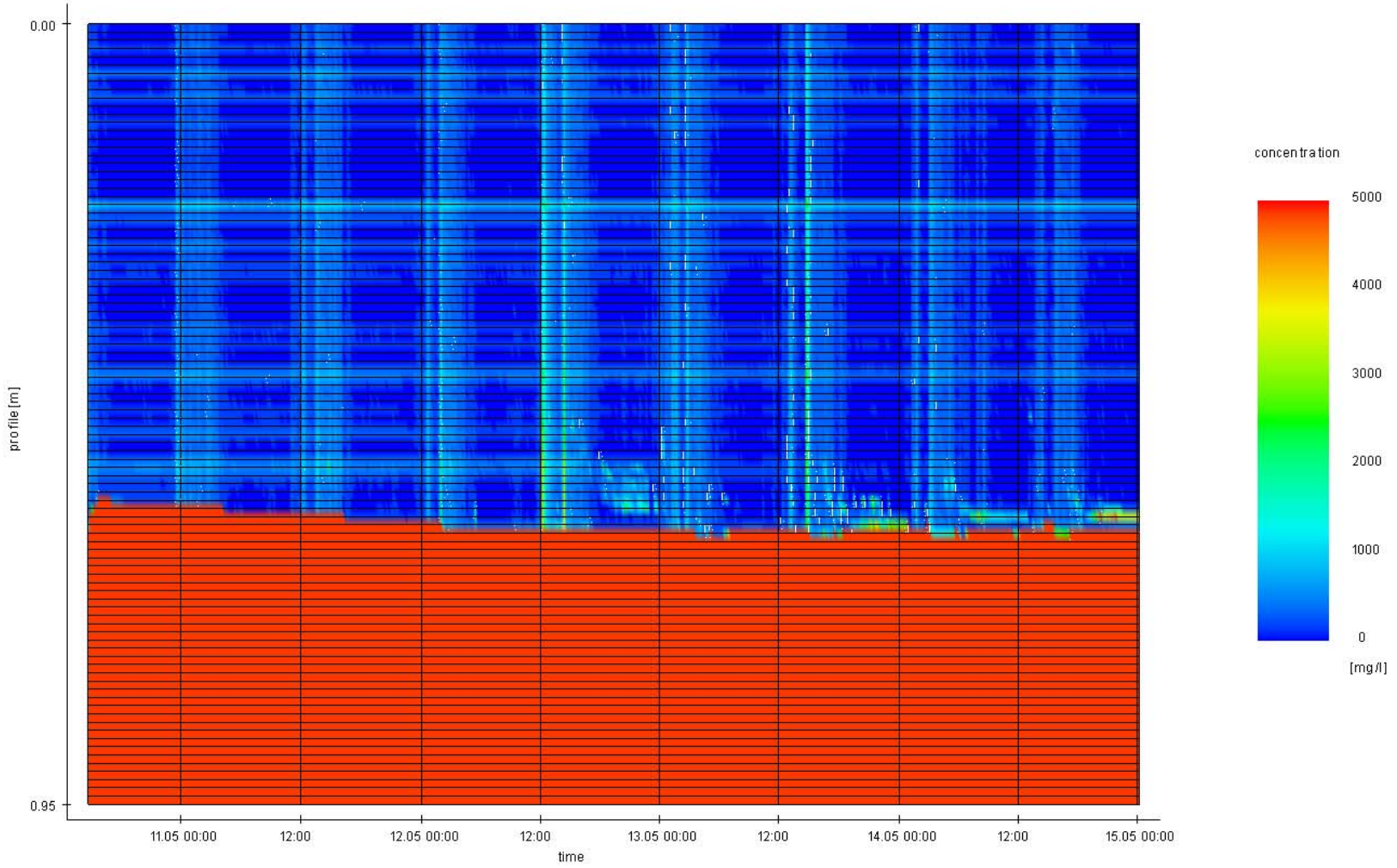
Date:
08/05/2006 – 10/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

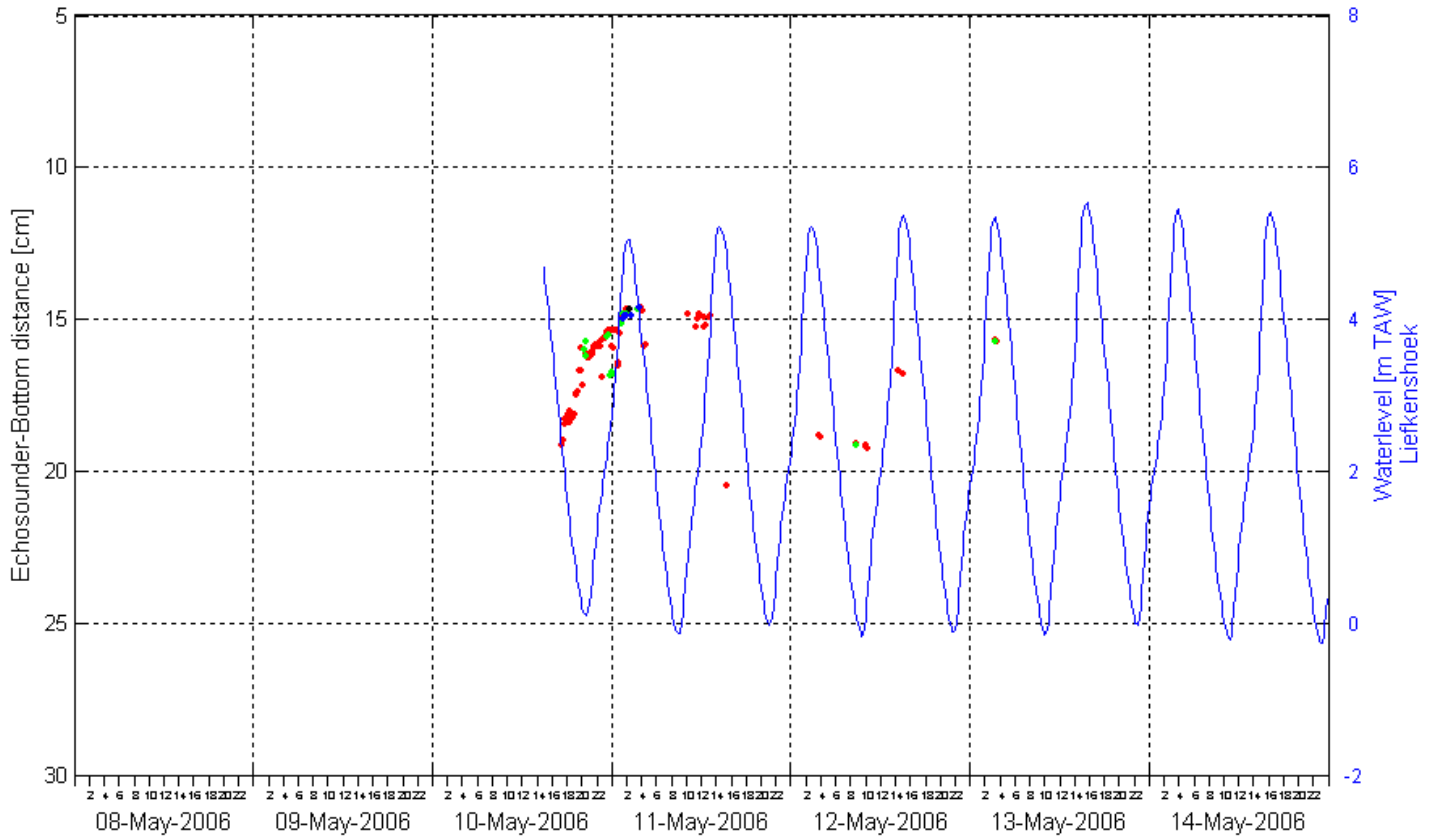
Location:	Date:
Deurganckdok Sill	10/05/2006 – 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

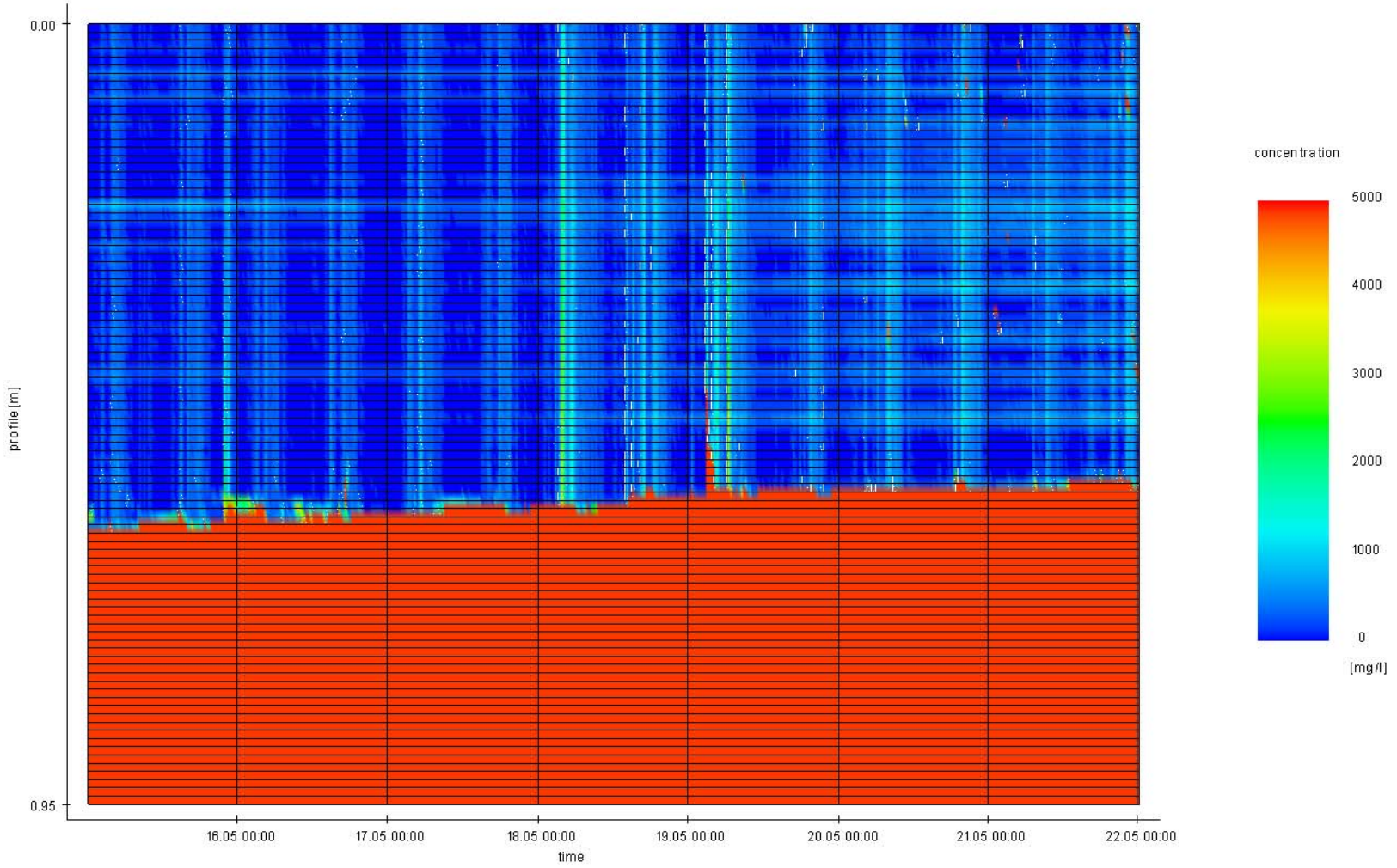
Date:
10/05/2006 – 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

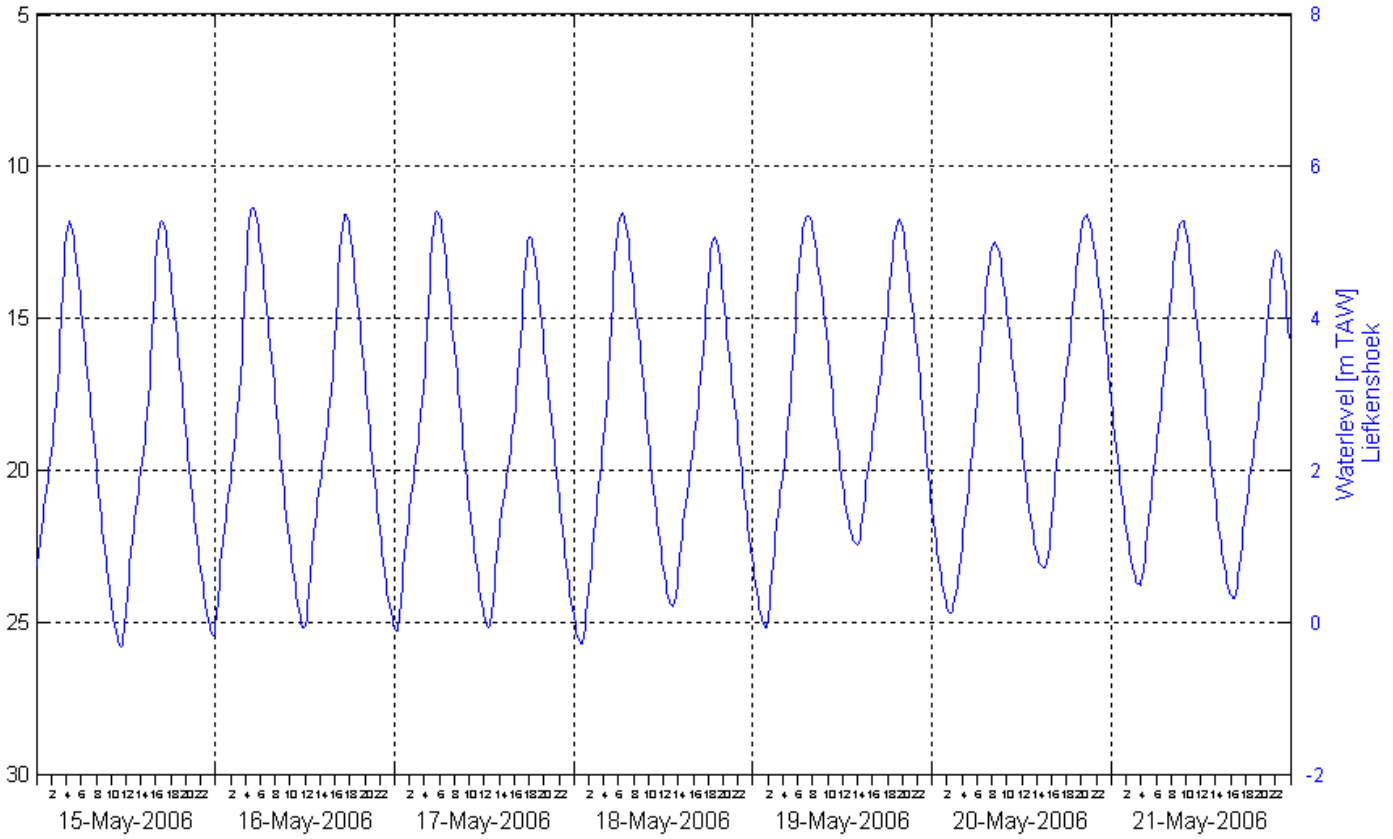
Location:	Date:
Deurganckdok Sill	15/05/2006 – 21/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

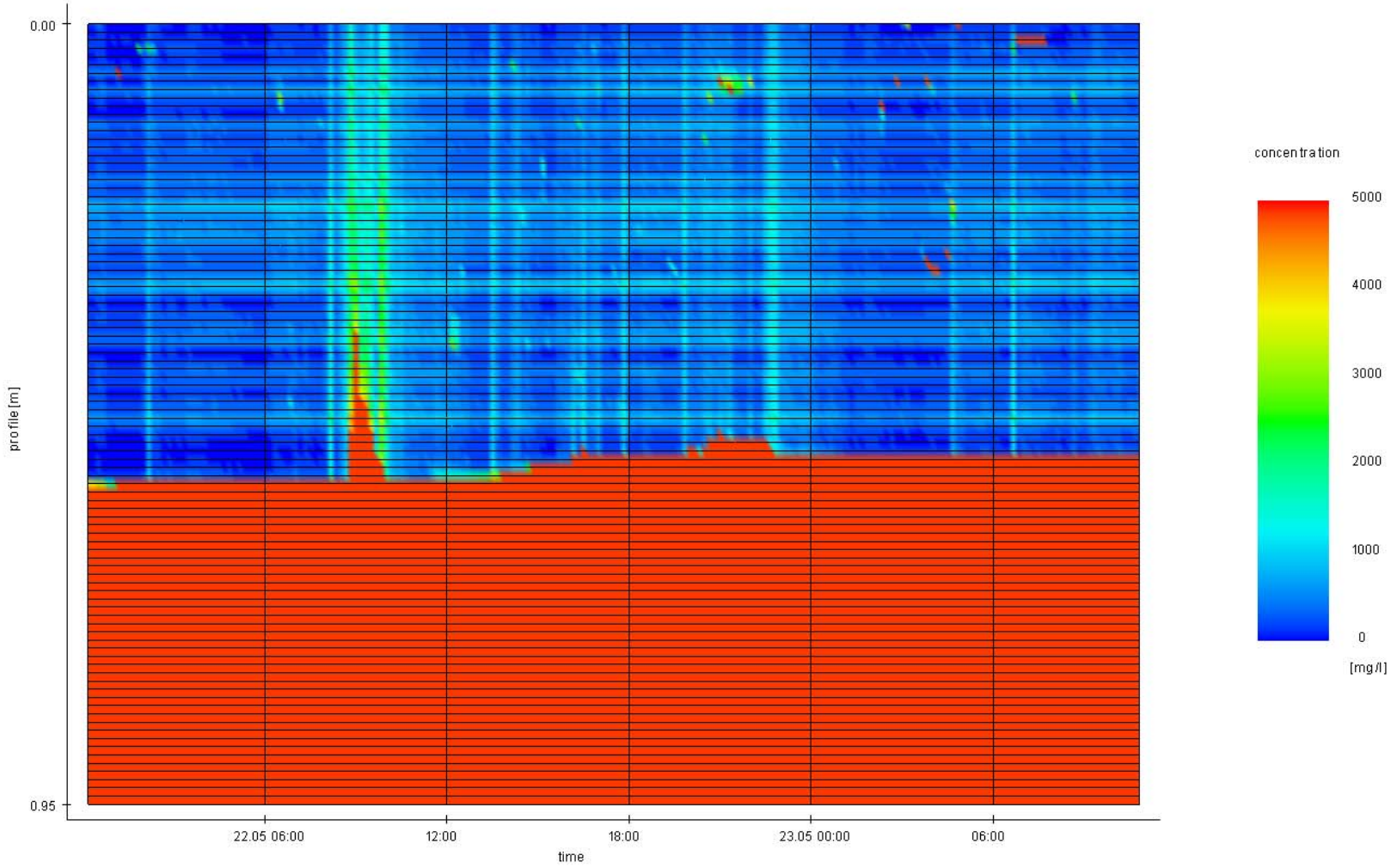
Date:
15/05/2006 – 21/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

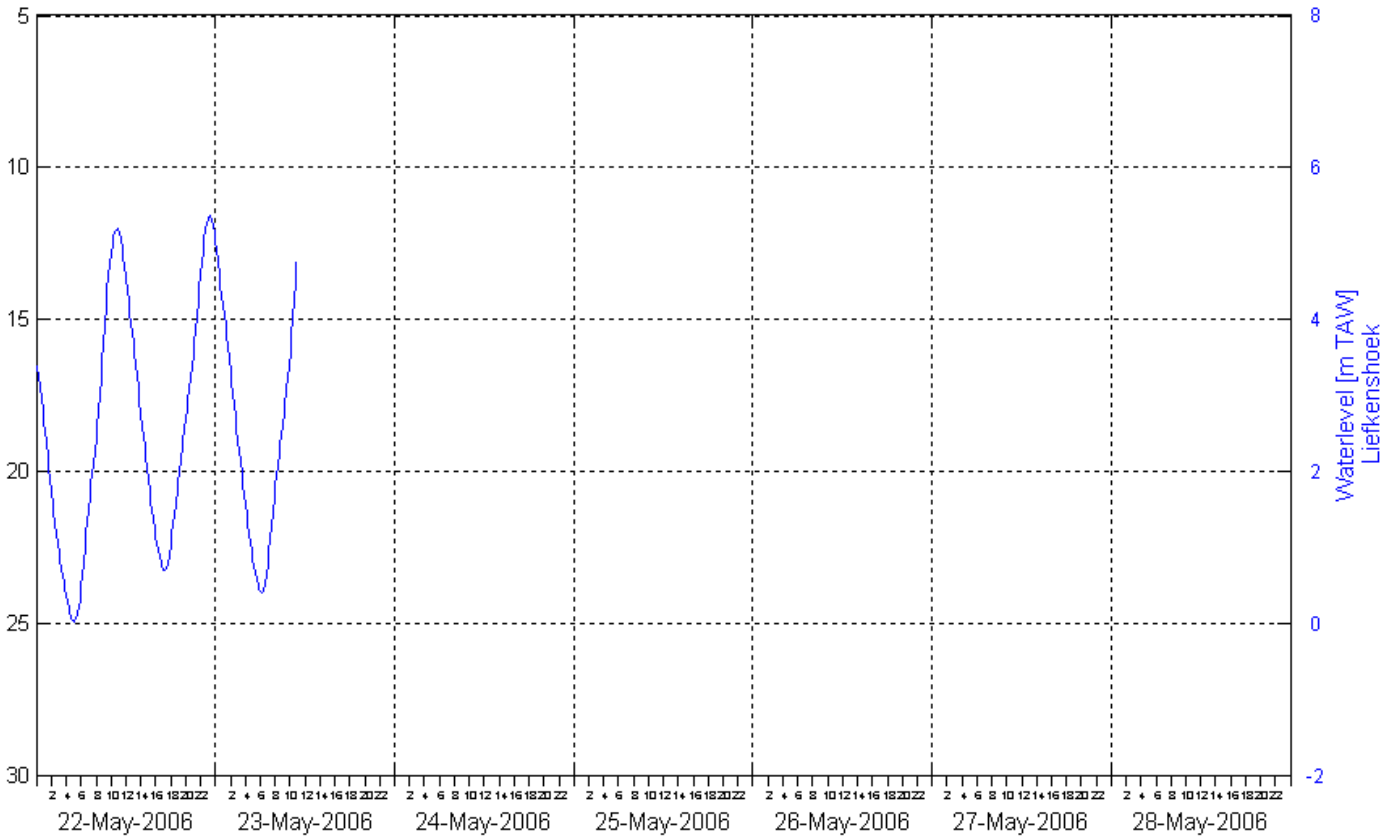
Location:	Date:
Deurganckdok Sill	22/05/2006 – 23/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

Date:
22/05/2006 – 23/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*119-114**	*113-104*	*103-94*	*93-84*	*83-74*	*73-64*	*63-54*	*53-44*	*43-34*	*33-24*
20060419	1	flood	3.6	201.3	164.3	162.9	166.7	155.8	170.6	177.8	190.8	219	369.2
20060420	1	ebb	5	155.4	116.3	106.8	114	105.2	118.8	126.8	137.7	150.2	196.3
20060420	2	flood	5.1	191.8	153.3	145.7	156	147.1	162.3	169.5	179.8	208.1	264.4
20060420	2	ebb	5	136.1	95.1	87.8	94.2	82.8	93.7	96.7	101.4	109.8	147.5
20060420	3	flood	4.5	154.9	119	111.4	119.2	110.1	129.4	134.2	146.6	166.8	211.5
20060421	3	ebb	4.6	128.8	94.4	86.2	94.1	85.4	96.1	97.5	104.6	111.8	153
20060421	4	flood	4.8	193	164.6	158.5	164.4	160.3	171.4	178	190.5	214.4	264.3
20060421	4	ebb	4.4	110.1	81	71.9	78.6	66	76.8	77.6	80.4	82.8	107
20060421	5	flood	4.1	126.9	97.4	88.6	94.9	85.3	96.6	96.9	107.4	124	157.7
20060422	5	ebb	4.3	107.7	77.2	65.6	71.7	61.4	69.4	70.5	71.2	73.7	91
20060422	6	flood	4.4	177.7	148	138	143.6	136	146.5	150.9	162.6	180.2	208.4
20060422	6	ebb	4.3	127.3	94.7	87.4	95.9	86.7	101.6	107.7	115.4	122.4	142.8
20060422	7	flood	3.8	150.9	115.9	107.6	116.4	105.6	117.8	119.6	126.7	134.7	193.6
20060423	7	ebb	4.1	96.6	57.3	49.6	55.6	45.5	52.8	52.6	54.2	59.3	71.4
20060423	8	flood	4.9	169.8	126.4	119.8	128.2	121.1	131.4	132.6	141.3	148.9	170.8
20060423	8	ebb	4.5	114.7	71.5	63.4	70.5	60.7	68.6	69.8	75.5	79.1	87.5
20060423	9	flood	4.3	153.5	106.8	101.1	105.3	96.5	106	106.4	113	124.1	164.6
20060424	9	ebb	4.8	118.7	60.5	53.6	58.5	48.7	57	57.5	62.5	68.1	76.8
20060424	10	flood	5.1	231	178	168.7	179.1	165.8	177	181.1	186.9	200.4	287.9
20060424	10	ebb	5.1	173	106.5	99	106.3	103.6	110.9	120.1	128.5	136.2	153.1
20060425	11	flood	5	194.9	124.9	117	124.5	114	122.2	125.8	137.7	149.4	170.4
20060425	11	ebb	5.4	153.3	74.9	66.5	73	62.9	67.2	69.2	72.5	76.6	84.7

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*119-114**	*113-104*	*103-94*	*93-84*	*83-74*	*73-64*	*63-54*	*53-44*	*43-34*	*33-24*
20060425	12	flood	5.9	211.1	139	129	136.5	130.4	139.2	144.8	154.1	171.1	186
20060425	12	ebb	5.3	158.2	83.5	78.3	80.2	69.6	88.4	84.8	88.5	93.6	103.8
20060426	13	flood	5.4	266.3	190.4	187.2	194.3	186.6	200.3	215.1	242.6	287.2	328.9
20060426	13	ebb	5.7	160.6	89.7	84.6	86.3	78.2	87.6	90.7	97.8	108.3	122.9
20060427	14	flood	5.8	131.3	170.1	128.4	126.1	113.1	122.2	163.1	189.5	169.7	3613.3
20060427	14	ebb	6.2	96.2	158.4	105.1	101.6	91.8	99	150.3	180.3	157.9	3215.7
20060427	15	flood	6.4	185.9	247.8	194.6	199.4	189.2	207.4	248.4	259.8	280.7	3174.5
20060427	15	ebb	6.1	120.6	174.8	124.2	127.7	116.7	125	134.9	153.4	171.4	3149
20060428	16	flood	5.9	168.5	221.7	171.7	177.8	165.8	180.8	190.3	210.5	227.5	3230.5
20060428	16	ebb	6.3	109.5	160.5	110.1	115.9	103.6	113.3	125.8	148.6	185.5	3174.2
20060428	17	flood	6.5	187.2	237.8	193.4	199.2	191.5	203.9	218.3	244.7	271.5	3170.4
20060428	17	ebb	6.1	278.2	328.7	287.2	297.7	292.1	304.3	319.5	356.9	577.4	3558.3
20060429	18	flood	6	224.9	275.1	233.2	245.9	241.4	266.5	292.8	333.8	387.8	3545.8
20060429	18	ebb	6.4	128.1	173.5	129	134.7	124.2	135.3	150.6	174.3	206.1	3341.7
20060429	19	flood	6.1	177.2	222.8	180.5	189.3	179.7	194.6	210.5	234.2	268.6	3141.1
20060429	19	ebb	6.1	104.5	148.4	105.2	113	102.6	108.6	119.6	131.4	143.2	3077.3
20060430	20	flood	6	136.7	181.8	141	149.4	141.8	155.2	173.8	192.7	219.5	2974.9
20060430	20	ebb	6.3	98.9	140.5	96.6	106.7	94.5	103.6	111.3	121.1	131.9	2636.7
20060430	21	flood	5.9	109.4	149.9	104	112.4	105.4	106.2	118.2	180.4	149.3	2620.8
20060501	21	ebb	6	99.8	141.9	107	136.7	91.8	99.6	109.1	117.4	125.8	2610
20060501	22	flood	5.8	109.4	151	106.7	115.4	108	114	131	149.4	174.1	2775.6
20060501	22	ebb	5.9	104.6	146.5	102.1	110	98.7	102.8	116.4	132.5	151.8	2613.7
20060501	23	flood	5.7	155.2	197.5	152.8	165.7	156.6	169.5	189.3	211.9	241.3	2651.1

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*119-114**	*113-104*	*103-94*	*93-84*	*83-74*	*73-64*	*63-54*	*53-44*	*43-34*	*33-24*
20060502	23	ebb	5.5	114.6	152.5	108.1	118.5	110.2	115.3	126.6	145.4	162	2590.2
20060502	24	flood	5.8	123.1	161.3	118.9	130.1	123.1	128.3	142.9	158.7	178.3	2645.8
20060502	24	ebb	5.4	112.6	152.6	105.5	117.3	103.6	105.6	126.1	129.2	138.4	2587.6
20060502	25	flood	5.1	159.3	199.1	155.1	170.6	159	187.6	263	206.7	251.5	2649.4
20060503	25	ebb	5.5	144.2	186.2	139.5	154.2	142.5	149.2	169.1	192.1	240.3	2752.5
20060503	26	flood	5.4	329.5	382	358.4	387.2	394	589.4	463.8	521.2	651.8	3428.8
20060503	26	ebb	4.9	145.1	187.9	136.1	149	138	663.4	162.5	179.1	212.3	3740.3
20060503	27	flood	4.9	221.7	264.5	218.9	355.8	227.8	244.3	274.6	298.6	339.3	2738.5
20060504	27	ebb	5	141.8	187.6	137.4	152	139.2	148.6	169.6	189.5	212.8	3324.9
20060504	28	flood	4.9	263.6	309.5	261	275.6	268.2	287.8	314.9	354	413.2	3851.4
20060504	28	ebb	4.6	158.7	202.7	154	168.8	156.5	166.9	182.9	193	206.4	3887.3
20060504	29	flood	4.2	204	246.5	202.8	221.1	212.6	231.1	265.8	308.5	358.8	4237.3
20060505	29	ebb	4.5	173.1	213.5	175.7	193.4	193.4	208.7	234.7	264.9	1176.7	4643.7
20060505	30	flood	4.5	324.2	363.5	322.8	340.8	337.4	369.9	405.4	457.3	1724.3	5000
20060505	30	ebb	4.1	244.4	281.9	243.8	262.4	259.6	277.8	302.1	347.3	1706.8	5000
20060505	31	flood	3.8	274.7	327.2	278.9	302.2	307.8	343.9	389.5	482.1	3297.9	5000
20060506	31	ebb	3.9	129.3	172.4	116.6	127.6	124.3	134.7	150	161.4	3256.8	5000
20060506	32	flood	4.3	218.6	266.9	216.5	230.8	235.4	263.9	306.9	355.6	3280.5	5000
20060506	32	ebb	4	98	140.8	86.1	94.6	89.7	97.1	105.6	113.8	3001	5000
20060506	33	flood	3.5	119.7	162.3	111.2	118.6	115	122.7	134.4	149.6	3076.9	5000
20060507	33	ebb	3.9	91.6	133.1	79.8	83.1	83.6	91.5	96.4	104.1	2756.7	5000
20060507	34	flood	4.3	165.1	207.3	156.8	160.3	166.2	174	183.3	204	2693.1	5000
20060507	34	ebb	4	97.1	133.8	87.3	87.2	94.5	99.3	100.7	108.7	2581.7	5000

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*119-114**	*113-104*	*103-94*	*93-84*	*83-74*	*73-64*	*63-54*	*53-44*	*43-34*	*33-24*
20060507	35	flood	3.8	125.8	160.8	116.6	117.9	127.5	138.3	143	158.2	2606	5000
20060508	35	ebb	4.3	89.3	125.6	83.4	80.1	91.2	99.6	97.8	103.6	2566.2	5000
20060508	36	flood	4.6	171.1	205.7	167.6	163.2	177.8	192.6	180.3	207.1	2451.7	5000
20060508	36	ebb	4.3	123.4	154.6	118.3	112.5	138.3	146.7	122.1	149.6	2199.8	5000
20060509	37	flood	4.3	167.3	204.2	163.7	153.8	183.8	192.8	170.5	214.7	2204.5	5000
20060509	37	ebb	4.6	134.3	171.1	131.1	120.6	156.3	166.1	133.2	169.5	2125	5000
20060509	38	flood	4.9	203.2	238.8	203.9	187.1	229.7	240.6	205.3	253.7	2172.3	5000
20060509	38	ebb	4.7	154	192	151.6	132.3	177.4	189.5	171.7	180.1	2149.2	5000
20060510	39	flood	4.7	231.5	269.2	225.6	202.8	252.1	267.4	223.9	272.3	2160	5000
20060510	39	ebb	5	159.7	200.3	162.5	134.6	178	205.2	151.5	189.6	2101.3	5000
20060511	40	flood	5.2	193.1	247.2	246.4	222	283.6	335.9	2694.8	3711.4	4223.2	5000
20060511	40	ebb	5.3	166.2	222.6	229.9	208.8	277	332.8	3208.4	5000	5000	5000
20060511	41	flood	5.4	278.6	337.5	347.1	332	401.3	460.6	3141.2	5000	5000	5000
20060511	41	ebb	5.3	190.9	252.2	258.1	237.1	306.7	352	2737.3	5000	5000	5000
20060512	42	flood	5.3	255.6	309.3	320.7	299.4	371.8	414	2617.6	5000	5000	5000
20060512	42	ebb	5.5	193.9	236.2	248.8	224.1	284.3	313.9	2160.1	5000	5000	5000
20060512	43	flood	5.6	400.5	447	483.6	487.9	588.1	687	2439.5	5000	5000	5000
20060512	43	ebb	5.6	191.2	240.2	253	229.9	286.2	321.9	2295	5000	5000	5000
20060513	44	flood	5.6	366	421	443.9	423.4	492.2	487.3	2370.3	5000	5000	5000
20060513	44	ebb	5.6	182.4	230.7	241.4	211.7	270.7	226.6	1960	5000	5000	5000
20060513	45	flood	5.8	307.5	360	384.7	368.6	443	415	2199	5000	5000	5000
20060513	45	ebb	5.6	179.8	223.8	237.9	207.4	260.5	226.8	2247.7	5000	5000	5000
20060514	46	flood	5.5	247.5	296.9	313	279.8	336.1	296.8	2277.1	5000	5000	5000

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]

Date	*Tide no.*	*Phase*	*Tidal diff [m]*	*119-114**	*113-104*	*103-94*	*93-84*	*83-74*	*73-64*	*63-54*	*53-44*	*43-34*	*33-24*
20060514	46	ebb	5.7	210.2	260.9	268.8	243.1	292.1	255.5	2197.2	5000	5000	5000
20060514	47	flood	5.6	208.7	258.3	272.3	241.2	285.6	245.2	2248.4	5000	5000	5000
20060514	47	ebb	5.8	152.6	193.6	213.6	185.2	223.5	179.7	2442.1	5000	5000	5000
20060515	48	flood	5.6	169.9	213.4	233.8	204.7	232	199.9	2341.9	5000	5000	5000
20060515	48	ebb	5.7	187.1	231.1	248	218.4	249.2	218.2	2420.7	5000	5000	5000
20060515	49	flood	5.7	193.8	236	252.6	219.9	243	204.2	2744	5000	5000	5000
20060515	49	ebb	5.6	237.9	288.6	304.5	306.2	356.1	381.7	2900.6	5000	5000	5000
20060516	50	flood	5.8	228.6	274.3	286.2	276.6	300.1	268.8	3430	5000	5000	5000
20060516	50	ebb	5.6	151.8	191.6	198.8	178.3	197.6	161.4	2889.3	5000	5000	5000
20060516	51	flood	5.5	236.2	281.1	299.5	282.6	303.2	271.3	3199.5	5000	5000	5000
20060517	51	ebb	5.6	136.3	175.5	160.2	141.8	180.7	153	3059.9	5000	5000	5000
20060517	52	flood	5.6	247.1	283.5	276.4	267.7	312.9	284.6	3139.1	5000	5000	5000
20060517	52	ebb	5.6	175.1	201	196.3	181.9	219.7	181.4	3456.4	5000	5000	5000
20060517	53	flood	5.2	216.5	241.1	260.5	230	267.5	238.7	3602.8	5000	5000	5000
20060518	53	ebb	5.5	162.1	185.6	217.1	183.7	214.5	184.9	3329.6	5000	5000	5000
20060518	54	flood	5.8	486.9	524.1	651.5	637.8	693.4	739.2	3697.4	5000	5000	5000
20060518	54	ebb	5.2	243.2	255.3	317.3	282.7	308.7	292	3468.6	5000	5000	5000
20060518	55	flood	4.9	398.8	420.4	557.4	486.8	532.9	552.2	4149.8	5000	5000	5000
20060519	55	ebb	5.3	197.2	221.1	324.9	257.3	291.9	277.5	4070.1	5000	5000	5000
20060519	56	flood	5.5	554.2	617.2	808.4	765.1	859.7	1466.4	4632.9	5000	5000	5000
20060519	56	ebb	4.4	235.6	276.7	408.1	310.6	341.8	312.2	4369.9	5000	5000	5000
20060519	57	flood	4.4	326.5	330.2	451.4	347.7	363.7	323.7	4537.7	5000	5000	5000
20060520	57	ebb	5.3	206.3	299.2	419.6	327.2	342.9	279.9	4381.1	5000	5000	5000

ARGUS Mean SS Concentration [mg/l] per tidal phase in layers of 10 cm (*except first column 6 cm) [distances given in cm above bottom]													
Date	***Tide no.***	***Phase***	***Tidal diff [m]***	***119-114****	***113-104***	***103-94***	***93-84***	***83-74***	***73-64***	***63-54***	***53-44***	***43-34***	***33-24***
20060520	58	flood	4.9	337.6	473	606.2	517.9	530.8	439.4	4556.3	5000	5000	5000
20060520	58	ebb	4.4	240.6	379.5	501.8	423.3	381.7	324.6	4541.5	5000	5000	5000
20060520	59	flood	4.8	436.2	520.6	669.1	595.7	535.7	531	4697.3	5000	5000	5000
20060521	59	ebb	4.9	186.8	342.9	489.4	445.7	374.6	297.5	4557.1	5000	5000	5000
20060521	60	flood	4.9	299.1	408	575	455.4	424.4	385.4	4608.1	5000	5000	5000
20060521	60	ebb	5.1	232.1	376.8	513.9	440.2	397.2	342.9	4846.9	5000	5000	5000
20060521	61	flood	4.7	432.3	589.2	617.3	546.8	491.3	479.4	5000	5000	5000	5000
20060522	61	ebb	5	268.9	429.9	560.7	527.2	482.1	390.1	4906.5	5000	5000	5000
20060522	62	flood	5.3	530.5	768.4	924.3	968.2	993.4	1310	5000	5000	5000	5000
20060522	62	ebb	4.6	382.6	565.7	639.9	633.7	596.9	1155.1	5000	5000	5000	5000
20060522	63	flood	4.8	472.4	773.7	740.7	695.6	620.3	2307.4	5000	5000	5000	5000
20060523	63	ebb	5	343.4	522.9	539.2	550.2	434	1793.2	5000	5000	5000	5000

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060419	1	HW	16	16.05	16.05	16.21
20060420	1	LW	15.63	15.68	15.72	15.72
20060420	2	HW	15.31	15.31	15.31	15.51
20060420	2	LW	15.8	15.84	15.92	16.25
20060420	3	HW	16.05	16.05	16.17	16.17
20060421	3	LW	16.29	16.29	16.66	16.66
20060421	4	HW	16.29	16.46	16.46	16.54
20060421	4	LW	16.62	16.62	16.7	-
20060421	5	HW	16.5	16.62	16.66	16.75
20060422	5	LW	16.66	16.75	16.91	-
20060422	6	HW	16.5	16.54	16.79	16.99
20060422	6	LW	16.21	16.75	16.87	-
20060422	7	HW	15.51	15.59	15.63	-
20060423	7	LW	16.05	16.17	16.91	-
20060423	8	HW	16.21	16.42	16.46	16.5
20060423	8	LW	16.79	16.99	17.94	18.02
20060423	9	HW	16.87	16.95	17.98	18.11
20060424	9	LW	16.99	17.12	17.16	17.94
20060424	10	HW	16.95	16.95	18.02	-
20060424	10	LW	17.28	17.41	17.98	18.02
20060425	11	HW	17.2	17.28	17.41	18.06
20060425	11	LW	17.49	17.82	17.9	17.98
20060425	12	HW	17.57	18.02	18.06	-
20060425	12	LW	18.19	18.19	18.19	18.31
20060426	13	HW	17.61	17.61	17.69	18.39
20060426	13	LW	18.23	18.35	18.43	-
20060427	14	HW	-	-	-	-
20060427	14	LW	-	-	-	-
20060427	15	HW	-	-	-	-
20060427	15	LW	-	-	-	-
20060428	16	HW	-	-	-	-
20060428	16	LW	-	-	-	-
20060428	17	HW	-	-	-	-
20060428	17	LW	-	-	-	-
20060429	18	HW	-	-	-	-
20060429	18	LW	-	-	-	-
20060429	19	HW	-	-	-	-
20060429	19	LW	-	-	-	-
20060430	20	HW	-	-	-	-

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060430	20	LW	-	-	-	-
20060430	21	HW	-	-	-	-
20060501	21	LW	-	-	-	-
20060501	22	HW	-	-	-	-
20060501	22	LW	-	-	-	-
20060501	23	HW	-	-	-	-
20060502	23	LW	-	-	-	-
20060502	24	HW	-	-	-	-
20060502	24	LW	-	-	-	-
20060502	25	HW	-	-	-	-
20060503	25	LW	-	-	-	-
20060503	26	HW	-	-	-	-
20060503	26	LW	-	-	-	-
20060503	27	HW	-	-	-	-
20060504	27	LW	-	-	-	-
20060504	28	HW	-	-	-	-
20060504	28	LW	-	-	-	-
20060504	29	HW	-	-	-	-
20060505	29	LW	-	-	-	-
20060505	30	HW	-	-	-	-
20060505	30	LW	-	-	-	-
20060505	31	HW	-	-	-	-
20060506	31	LW	-	-	-	-
20060506	32	HW	-	-	-	-
20060506	32	LW	-	-	-	-
20060506	33	HW	-	-	-	-
20060507	33	LW	-	-	-	-
20060507	34	HW	-	-	-	-
20060507	34	LW	-	-	-	-
20060507	35	HW	-	-	-	-
20060508	35	LW	-	-	-	-
20060508	36	HW	-	-	-	-
20060508	36	LW	-	-	-	-
20060509	37	HW	-	-	-	-
20060509	37	LW	-	-	-	-
20060509	38	HW	-	-	-	-
20060509	38	LW	-	-	-	-
20060510	39	HW	-	-	-	-
20060510	39	LW	-	-	-	-
20060510	40	HW	-	-	-	-

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060510	40	LW	16	16	-	-
20060511	41	HW	14.69	14.81	14.89	-
20060511	41	LW	-	-	-	-
20060511	42	HW	-	-	-	-
20060511	42	LW	-	-	-	-
20060512	43	HW	-	-	-	-
20060512	43	LW	-	-	-	-
20060512	44	HW	-	-	-	-
20060512	44	LW	-	-	-	-
20060513	45	HW	-	-	-	-
20060513	45	LW	-	-	-	-
20060513	46	HW	-	-	-	-
20060513	46	LW	-	-	-	-
20060514	47	HW	-	-	-	-
20060514	47	LW	-	-	-	-
20060514	48	HW	-	-	-	-
20060514	48	LW	-	-	-	-
20060515	49	HW	-	-	-	-
20060515	49	LW	-	-	-	-
20060515	50	HW	-	-	-	-
20060515	50	LW	-	-	-	-
20060516	51	HW	-	-	-	-
20060516	51	LW	-	-	-	-
20060516	52	HW	-	-	-	-
20060517	52	LW	-	-	-	-
20060517	53	HW	-	-	-	-
20060517	53	LW	-	-	-	-
20060517	54	HW	-	-	-	-
20060518	54	LW	-	-	-	-
20060518	55	HW	-	-	-	-
20060518	55	LW	-	-	-	-
20060518	56	HW	-	-	-	-
20060519	56	LW	-	-	-	-
20060519	57	HW	-	-	-	-
20060519	57	LW	-	-	-	-
20060519	58	HW	-	-	-	-
20060520	58	LW	-	-	-	-
20060520	59	HW	-	-	-	-
20060520	59	LW	-	-	-	-
20060520	60	HW	-	-	-	-

ALTUS Echosounder bottom distance [cm]						
Date	**Tide no.**	**HW/LW**	**Signal 1**	**Signal 2**	**Signal 3**	**Signal 4**
20060521	60	LW	-	-	-	-
20060521	61	HW	-	-	-	-
20060521	61	LW	-	-	-	-
20060521	62	HW	-	-	-	-
20060522	62	LW	-	-	-	-
20060522	63	HW	-	-	-	-
20060522	63	LW	-	-	-	-
20060522	64	HW	-	-	-	-
20060523	64	LW	-	-	-	-

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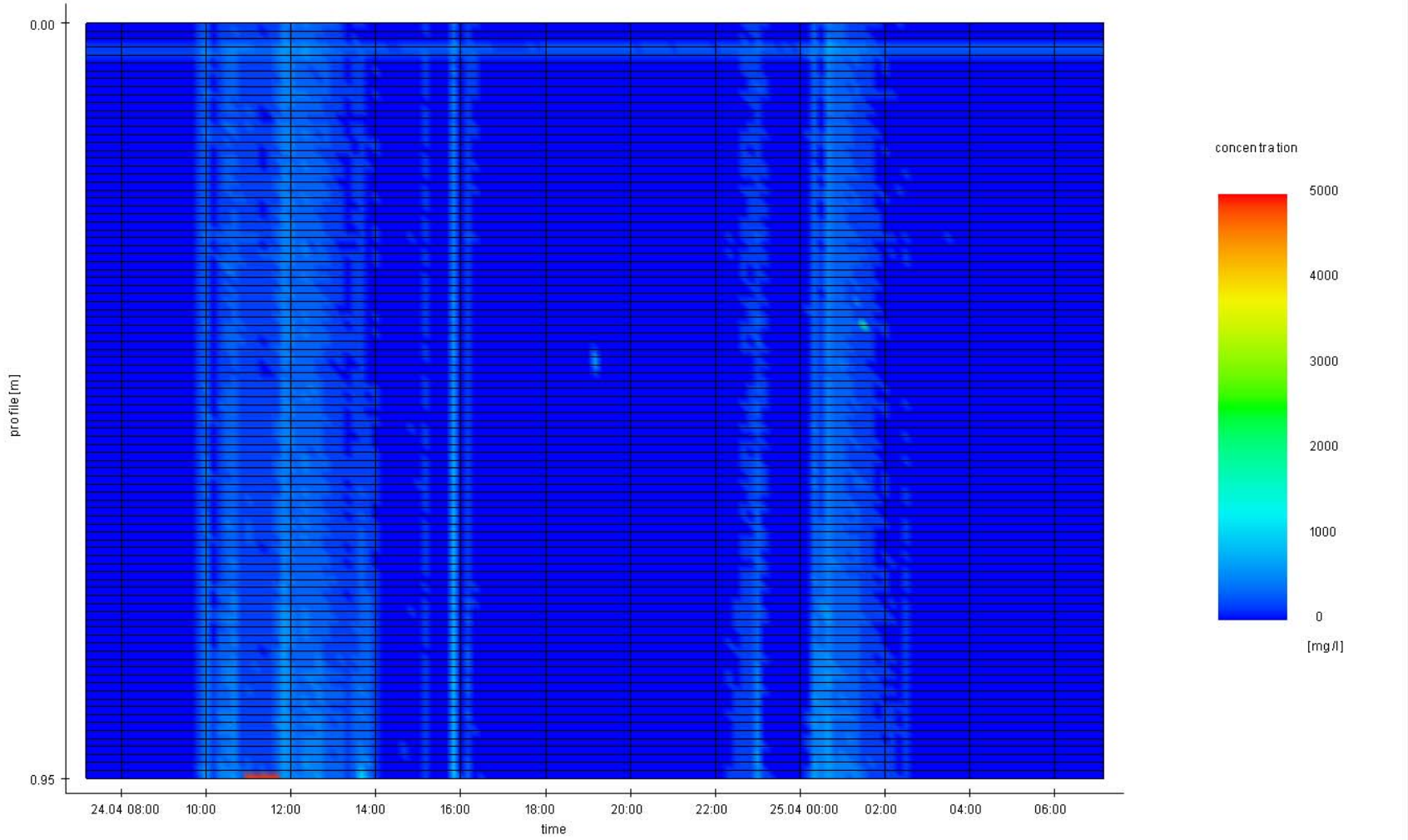
11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



Time series suspended sediment concentration
ARGUS ASM-IV

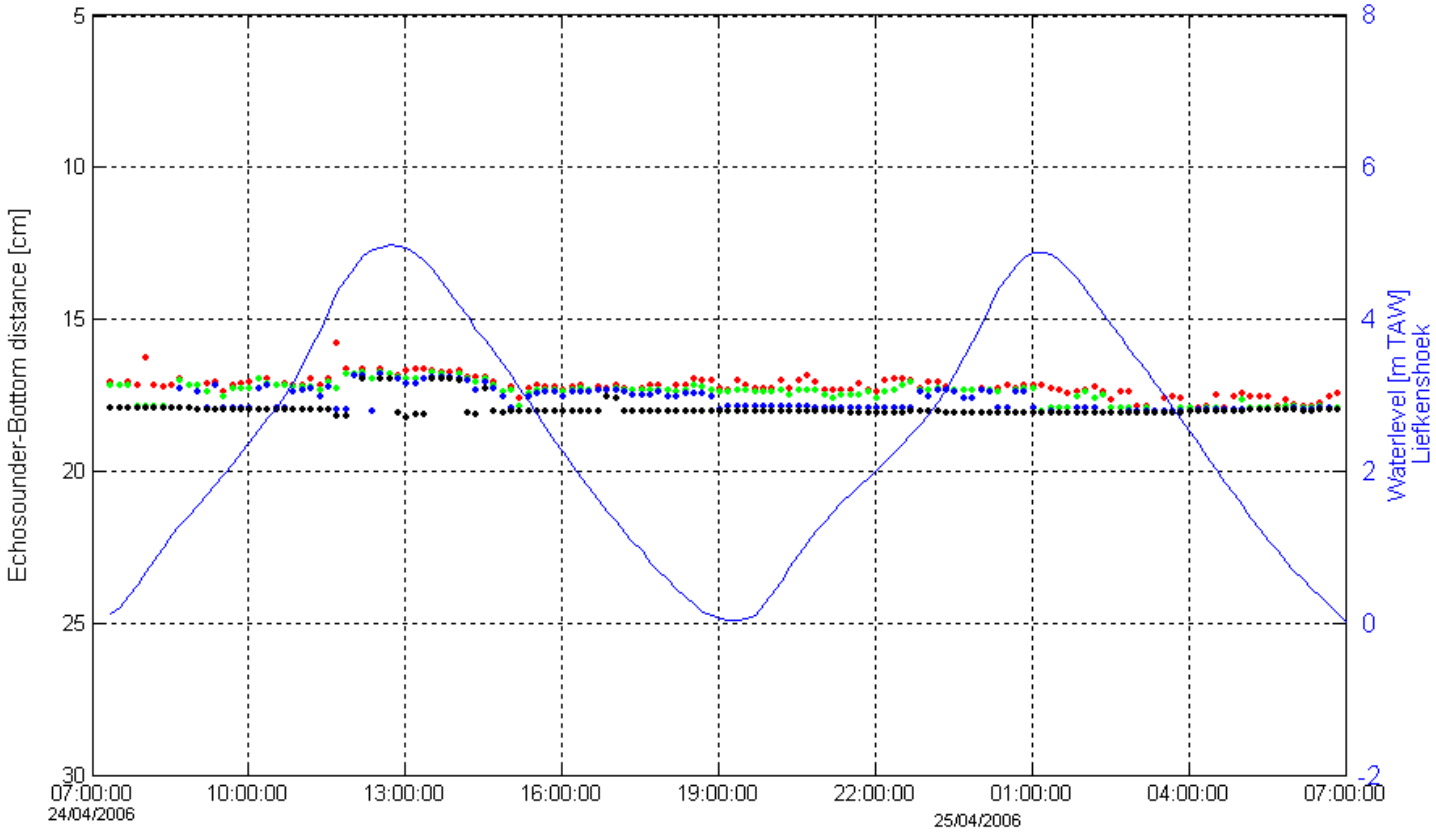
Location:	Date:
Deurganckdok Sill	Avg Tide 24/04 – 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok - Near bed continuous monitoring – Spring 2006



SIGNAL 4
SIGNAL 3
SIGNAL 2
SIGNAL 1

Legend

Echosounder – bottom distance
Waterlevel [mTAW] at Liefkenshoek

Location:
Deurganckdok Sill

Date:
Avg Tide 24/04 – 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

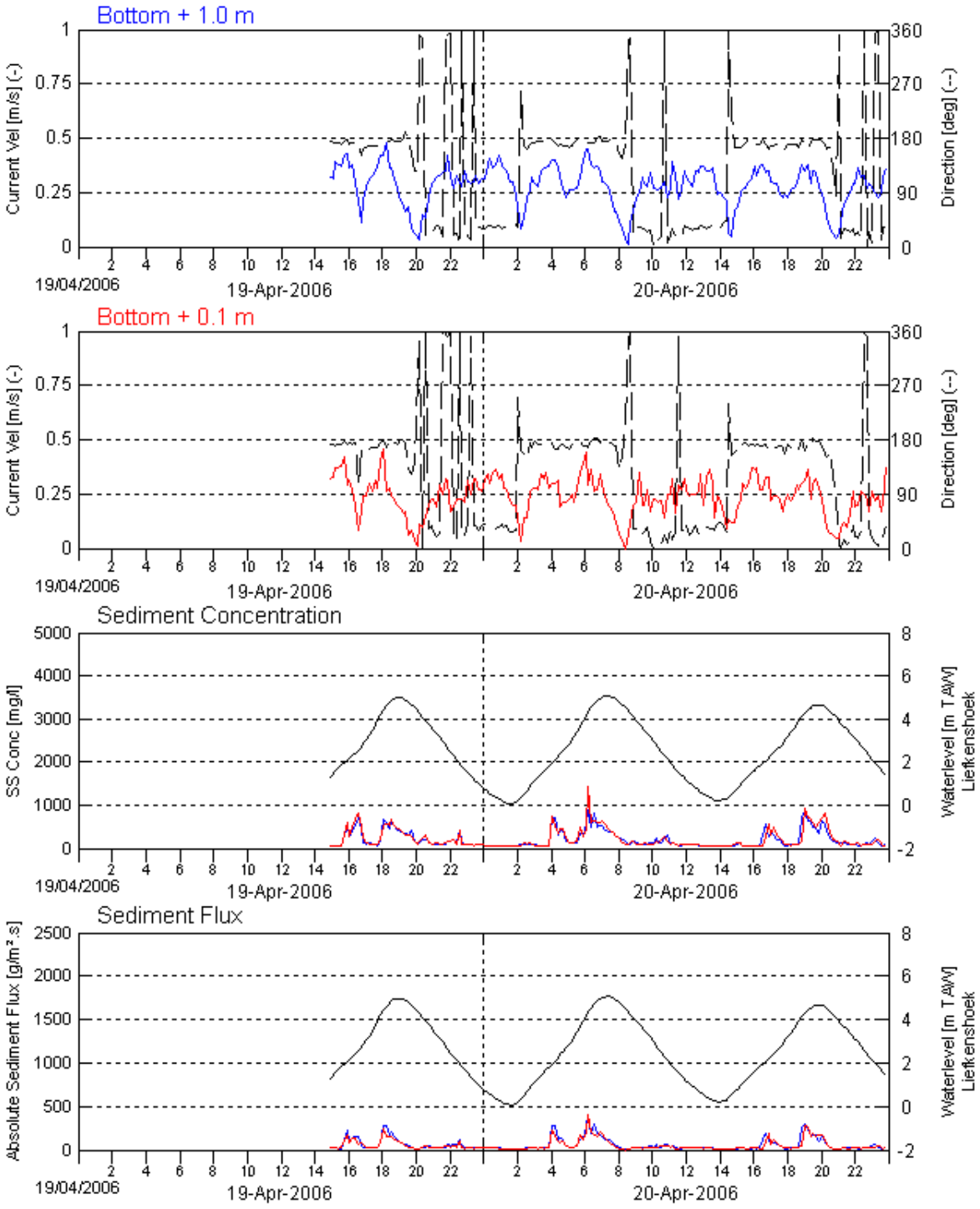
I/RA/11283/06.121/MSA

APPENDIX D.

TIMESERIES RCM9 & VALEPORT

D.1 CDW frame

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

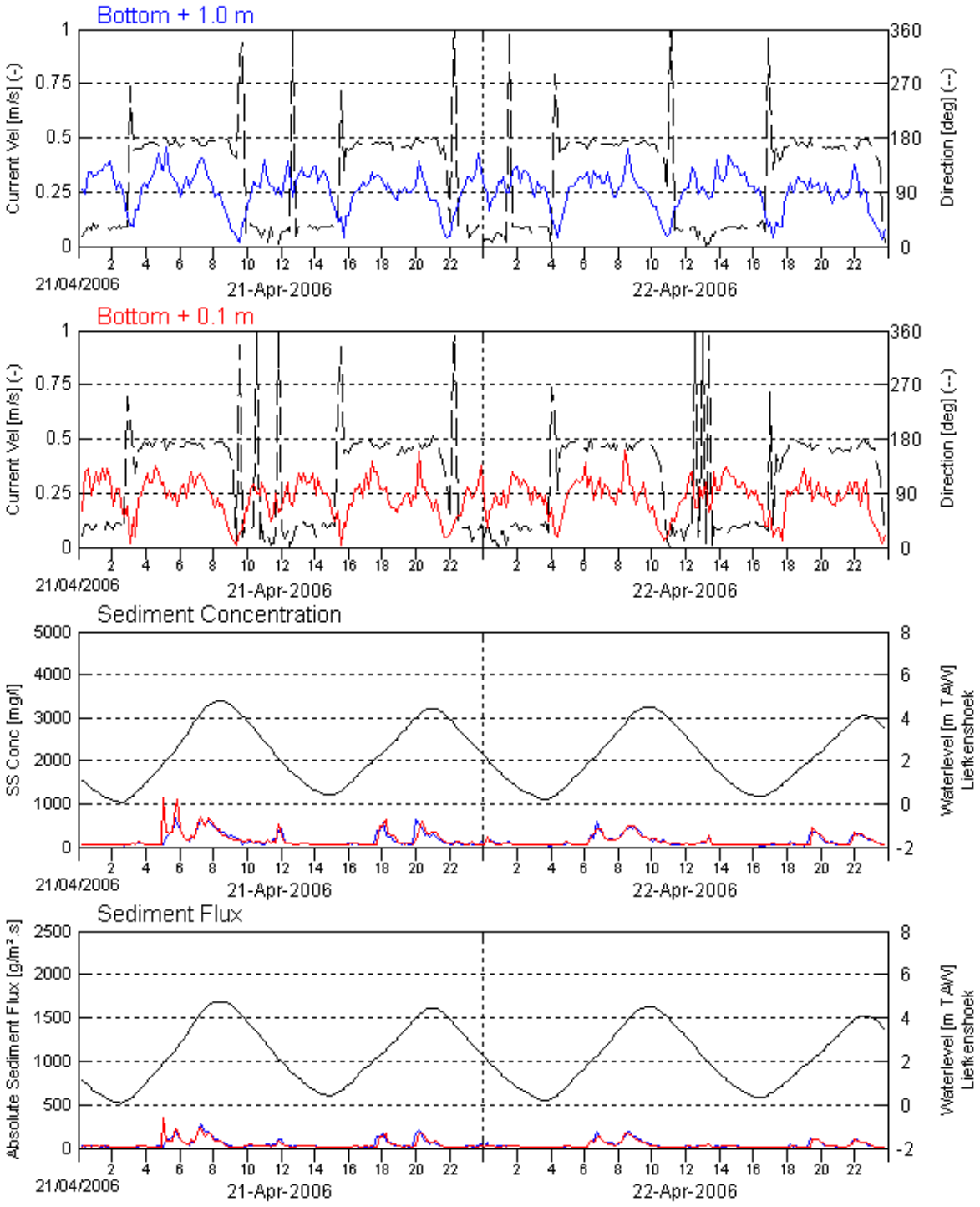
Date:
19/04/2006– 20/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

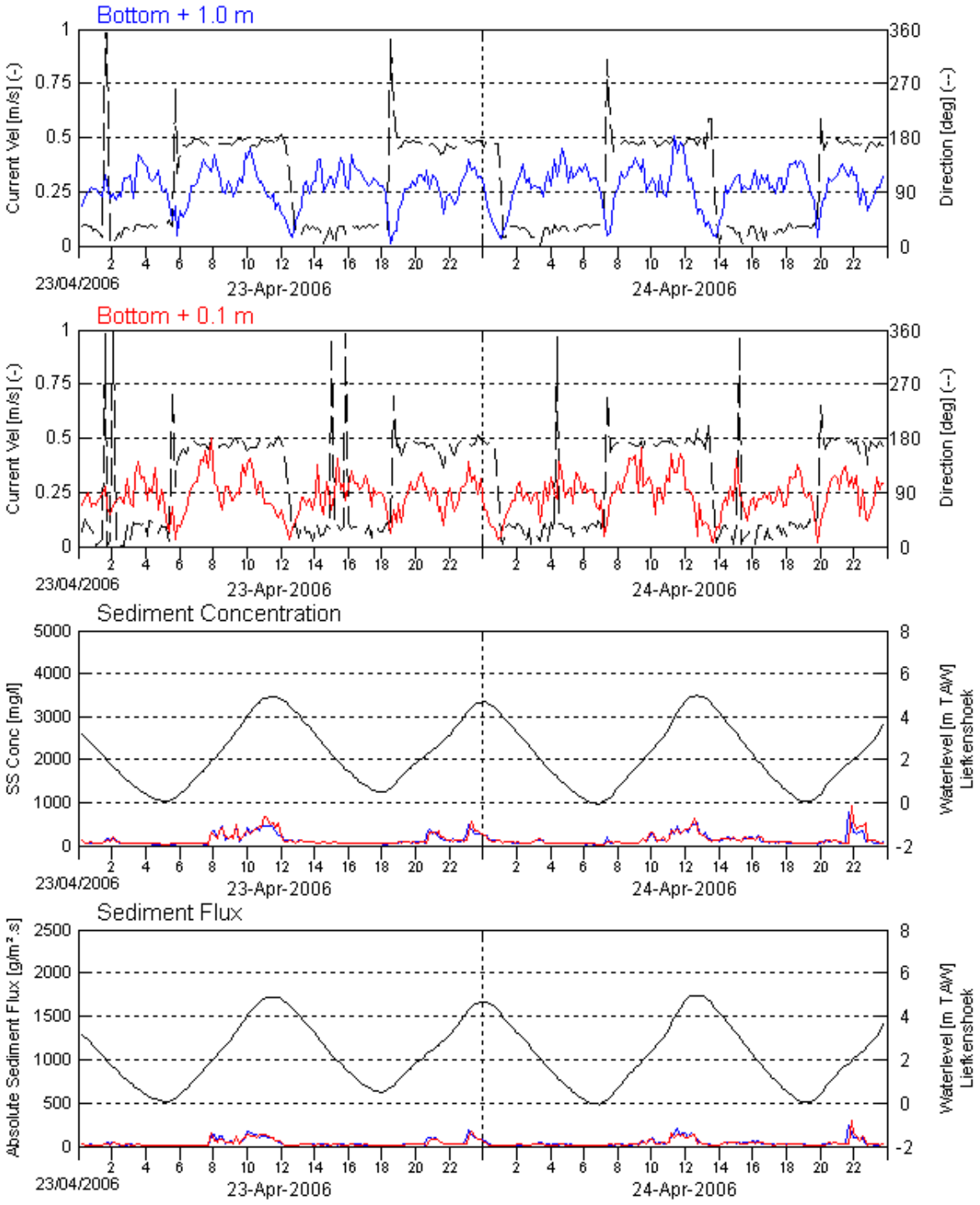
Date:
21/04/2006– 22/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

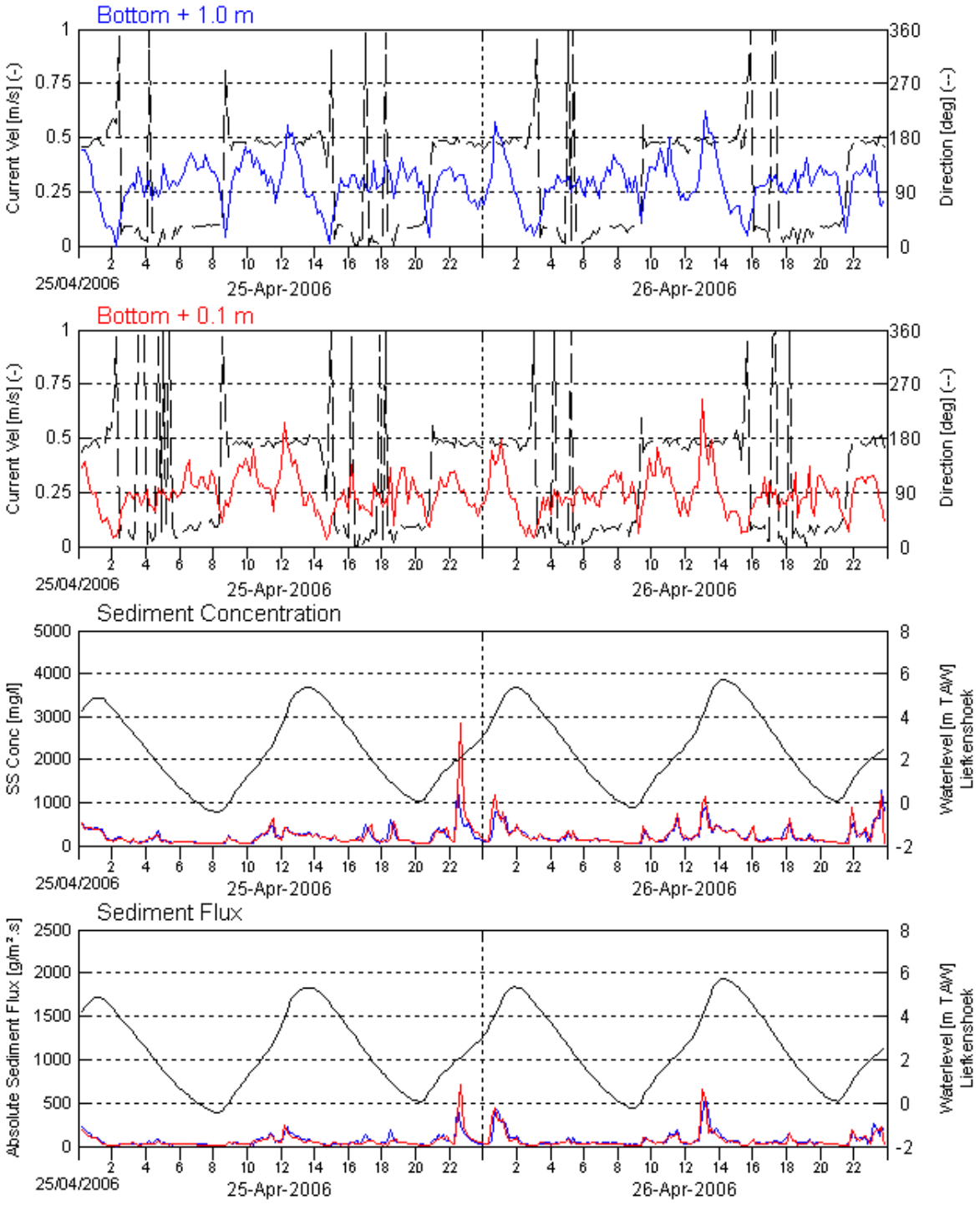
Date:
23/04/2006– 24/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

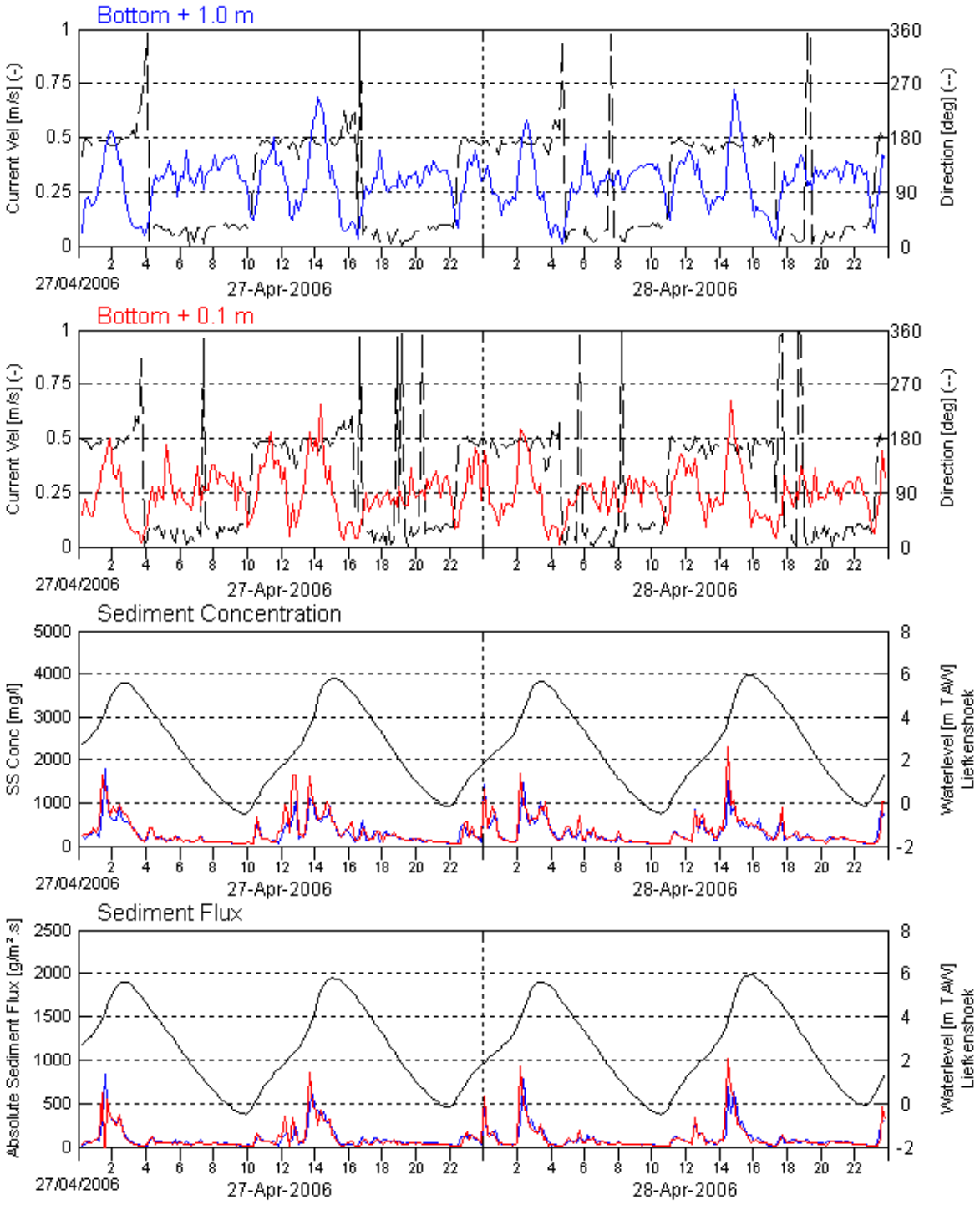
Date:
25/04/2006– 26/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

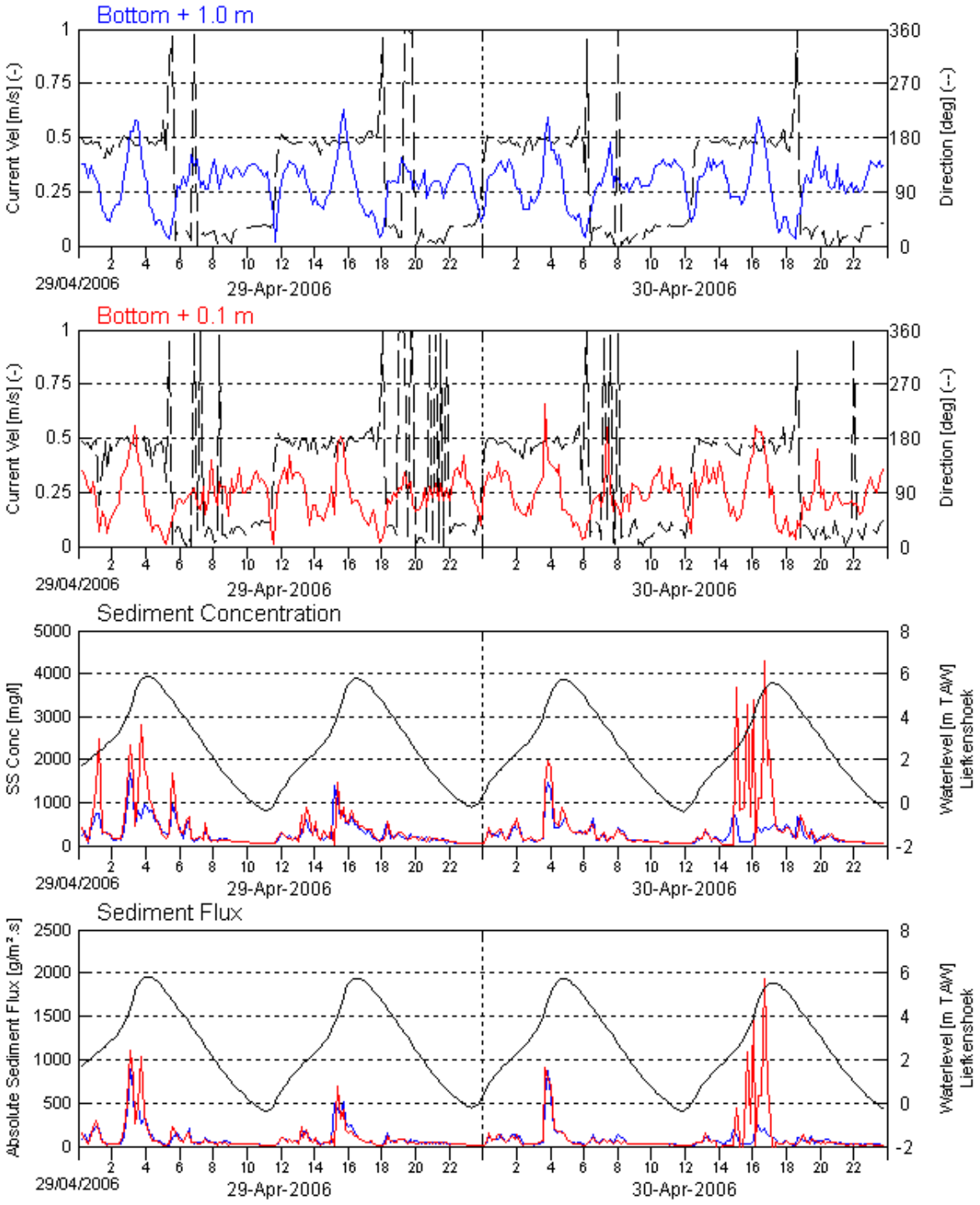
Date:
27/04/2006– 28/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok
CDW

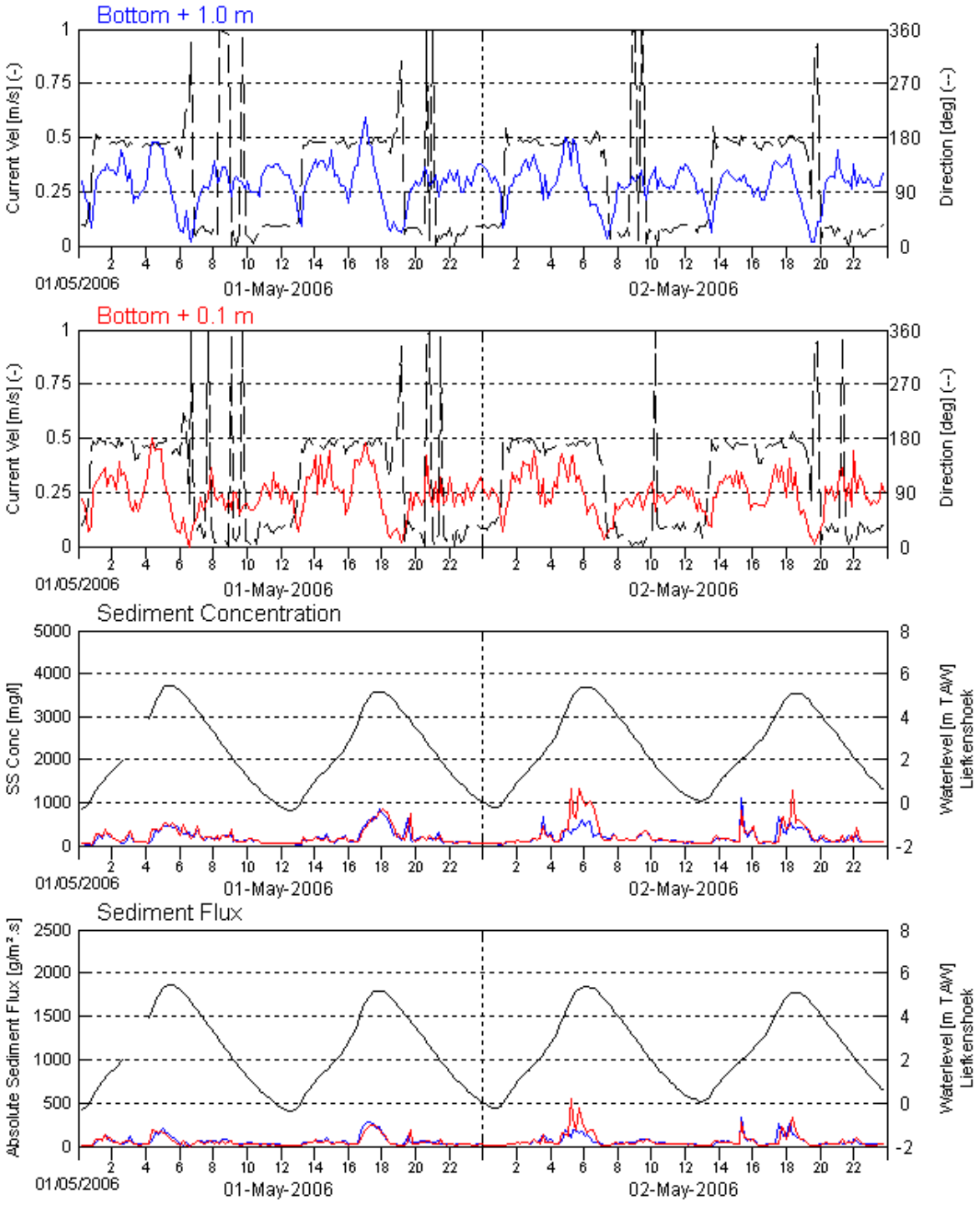
Date:
29/04/2006– 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

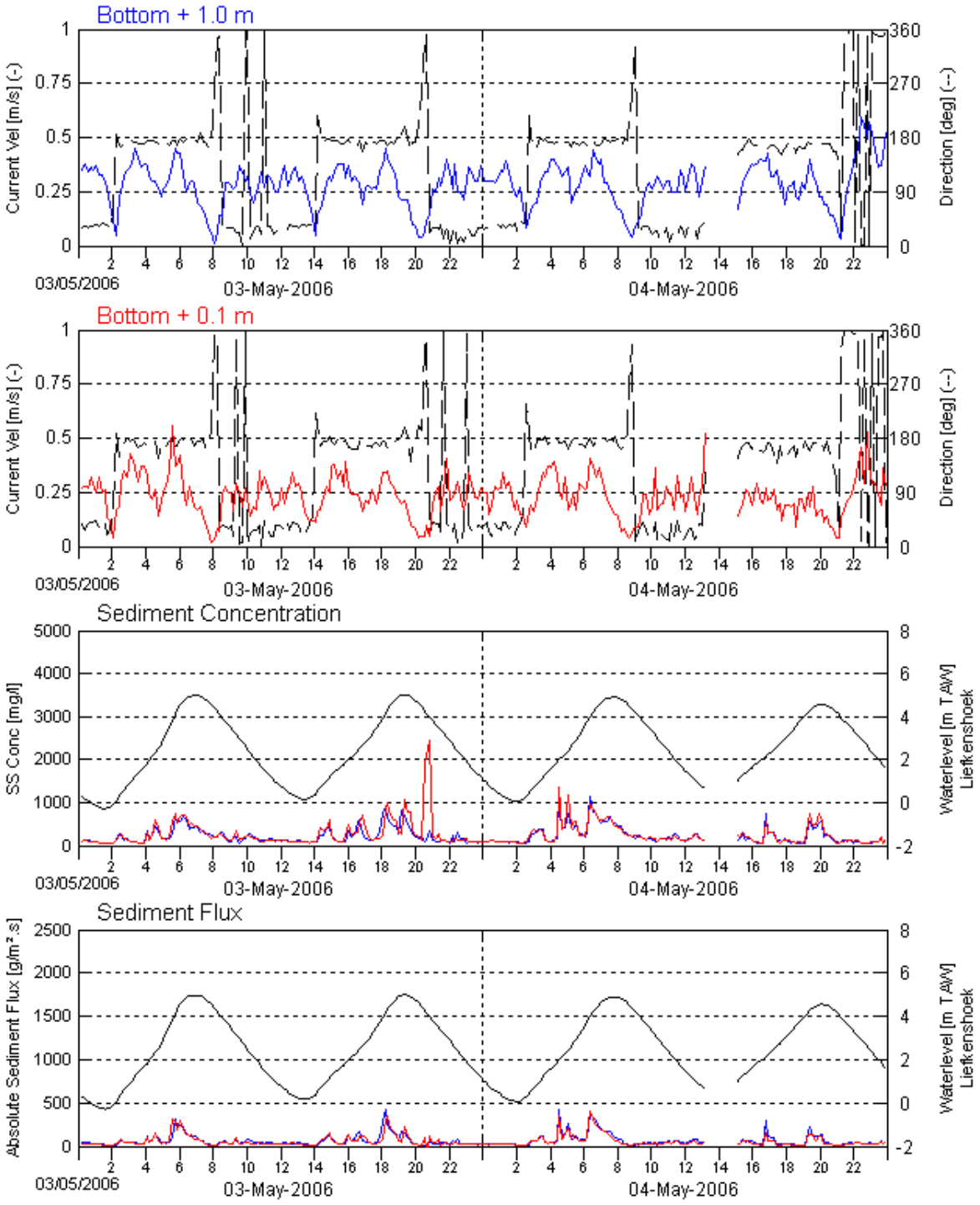
Date:
01/05/2006– 02/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

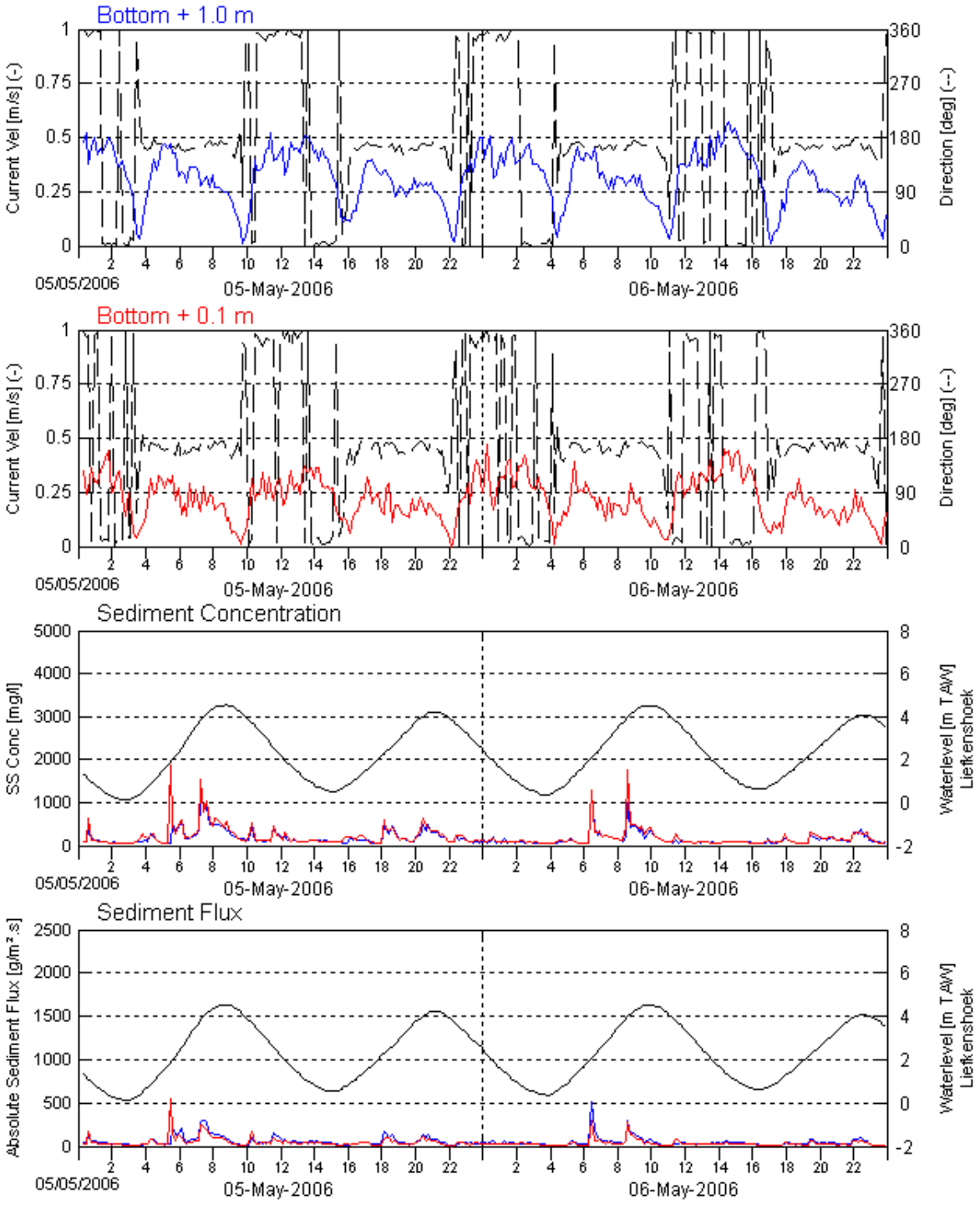
Date: 03/05/2006– 04/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

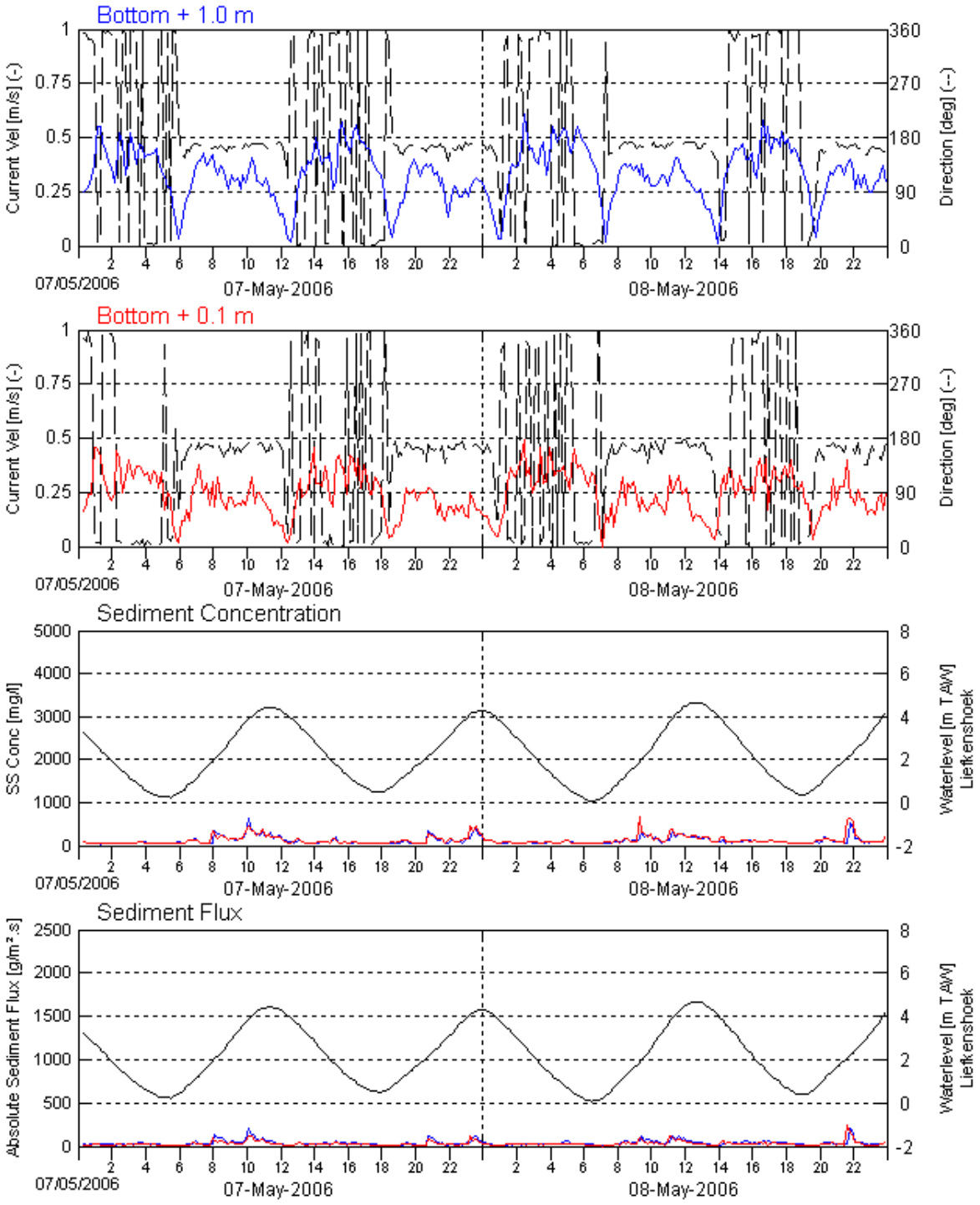
Date: 05/05/2006– 06/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

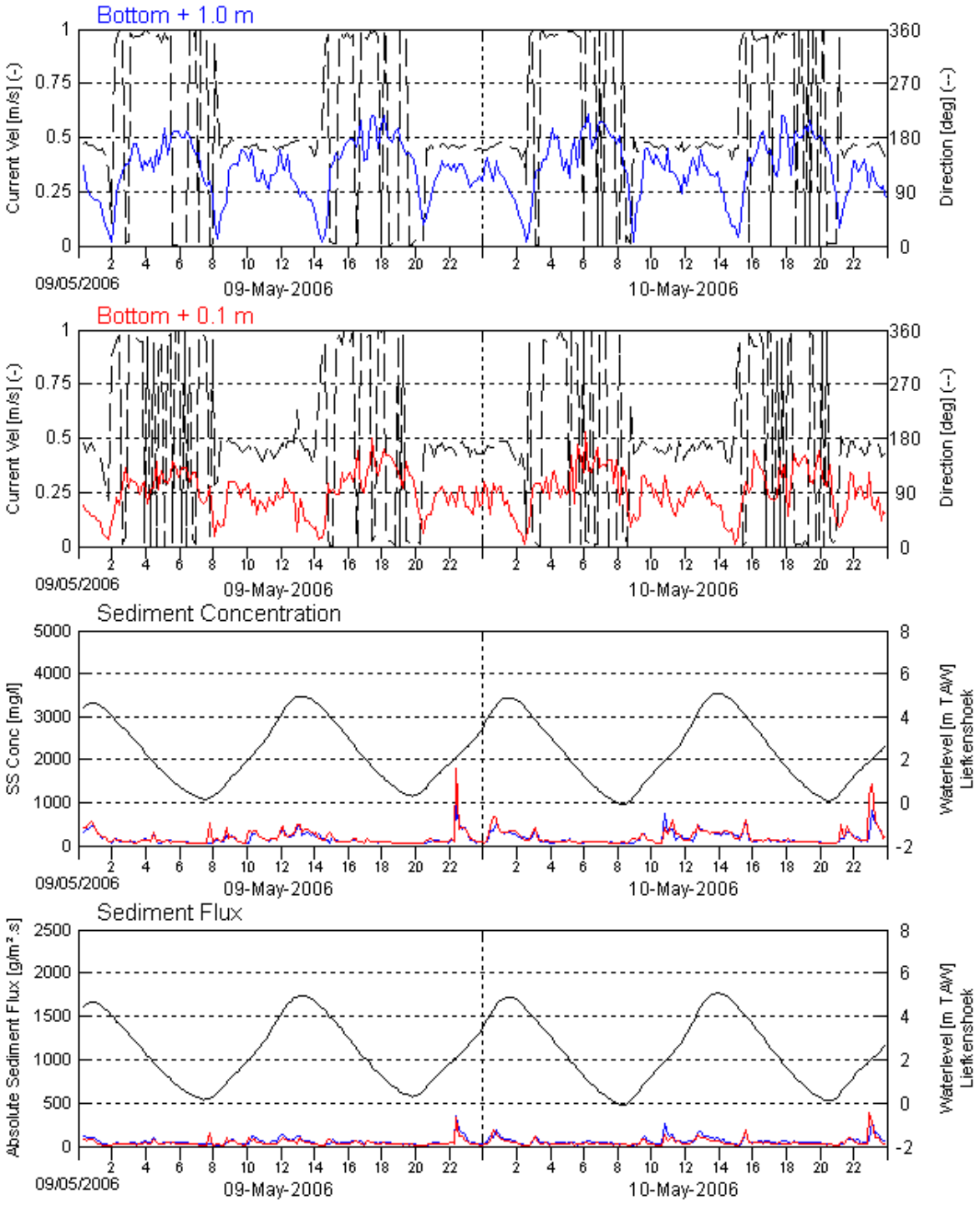
Location:	Date:
Deurganckdok CDW	07/05/2006– 08/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

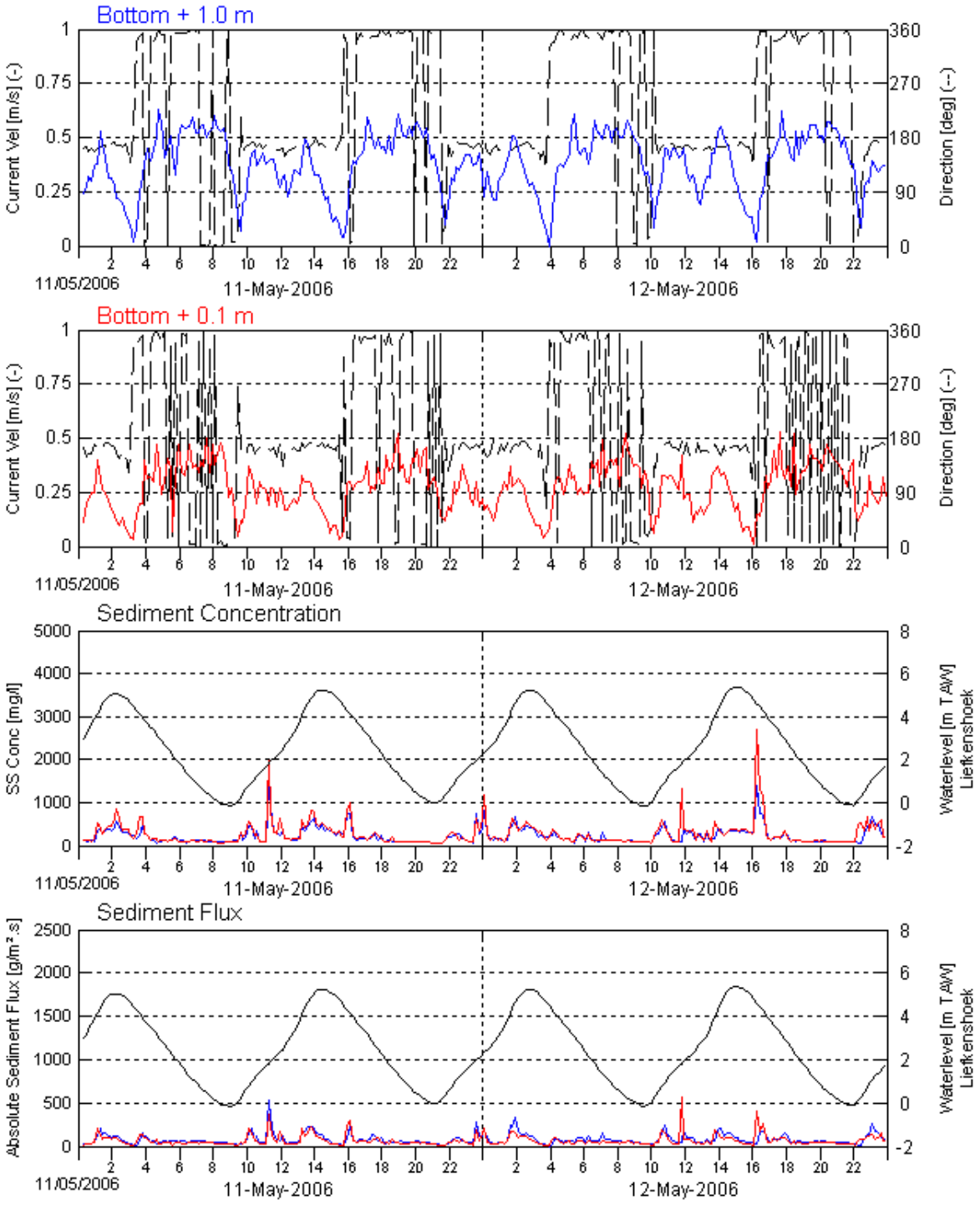
Date:
09/05/2006– 10/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

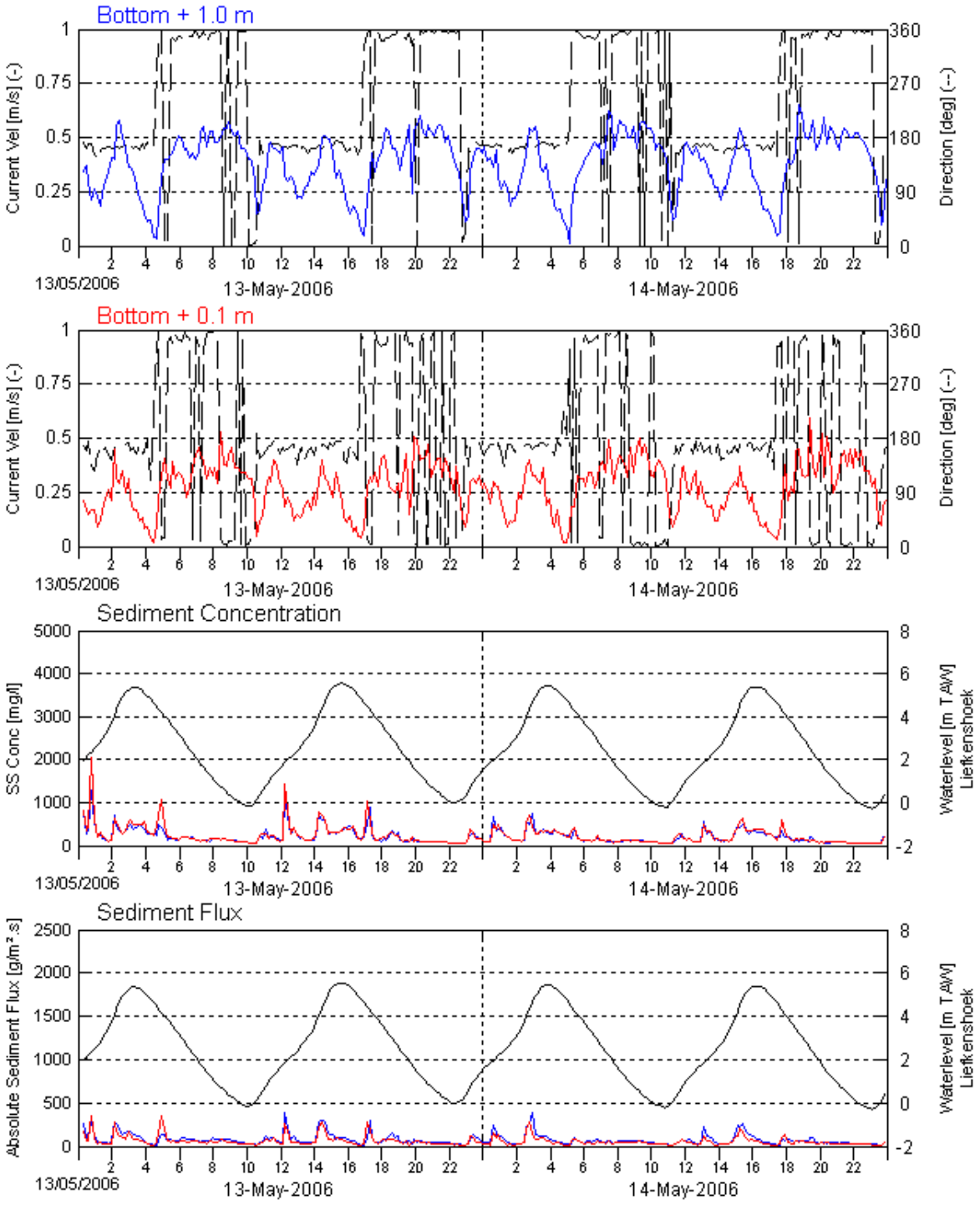
Date: 11/05/2006– 12/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok
CDW

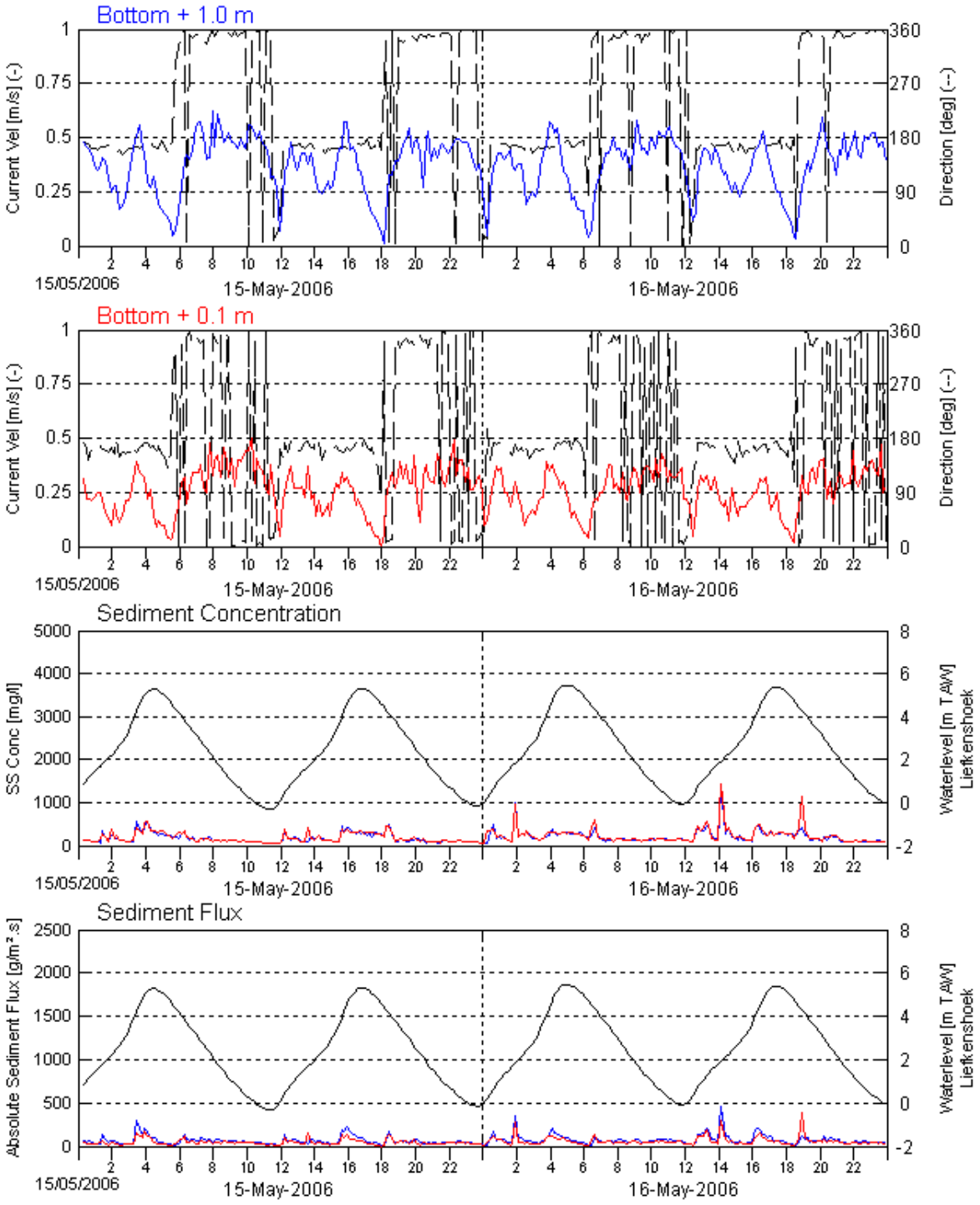
Date:
13/05/2006– 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

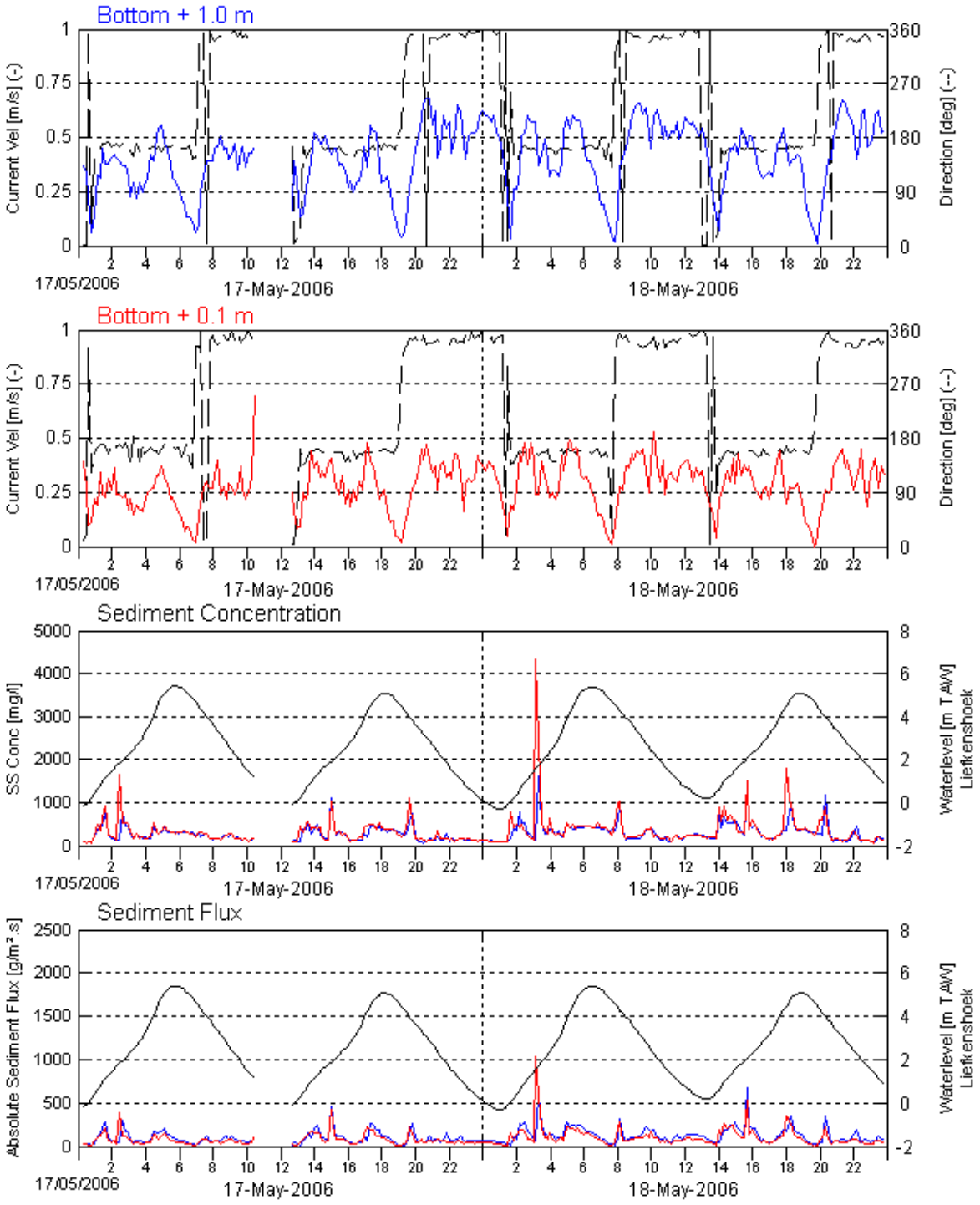
Date: 15/05/2006– 16/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok CDW

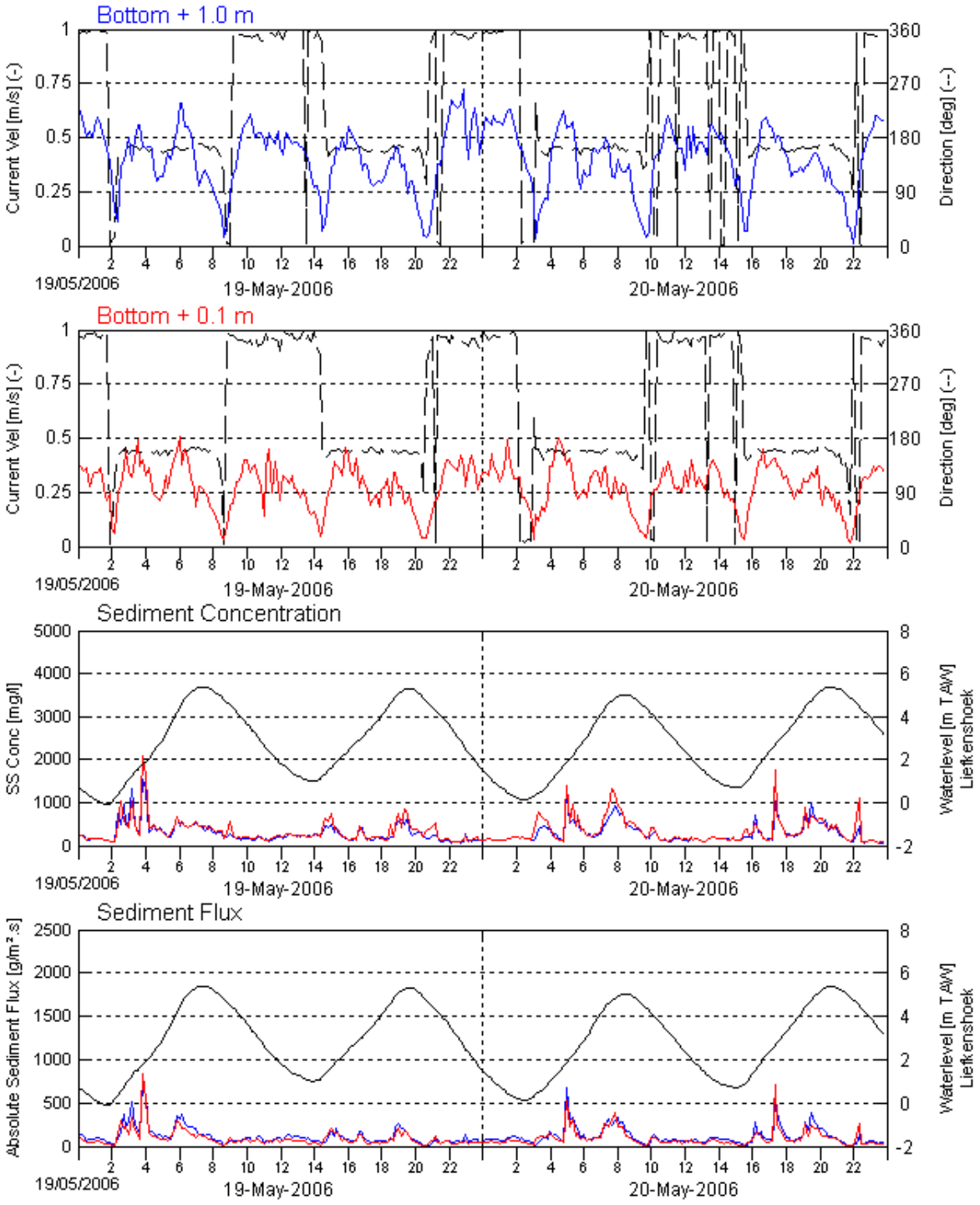
Date:
17/05/2006– 18/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok
CDW

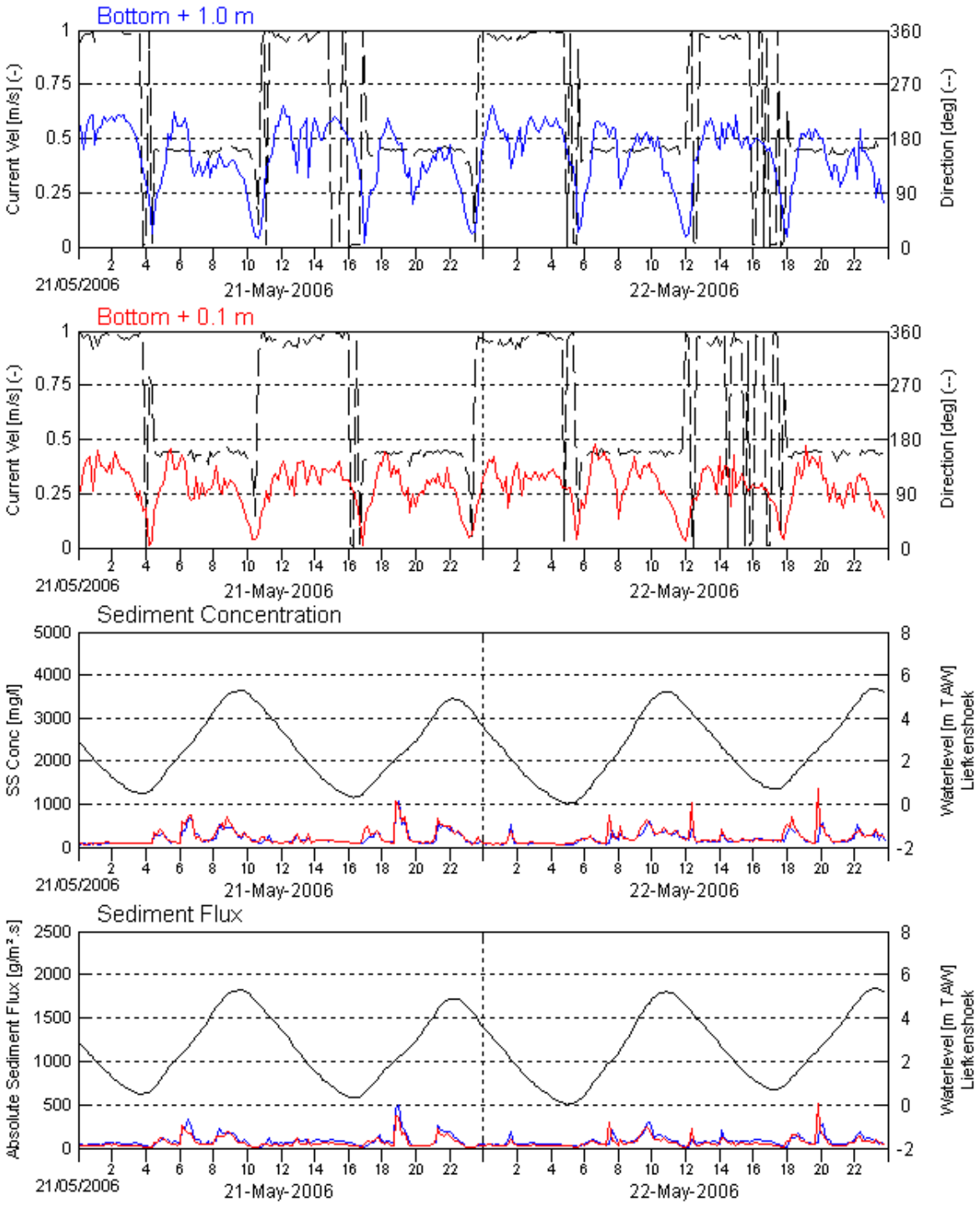
Date:
19/05/2006– 20/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

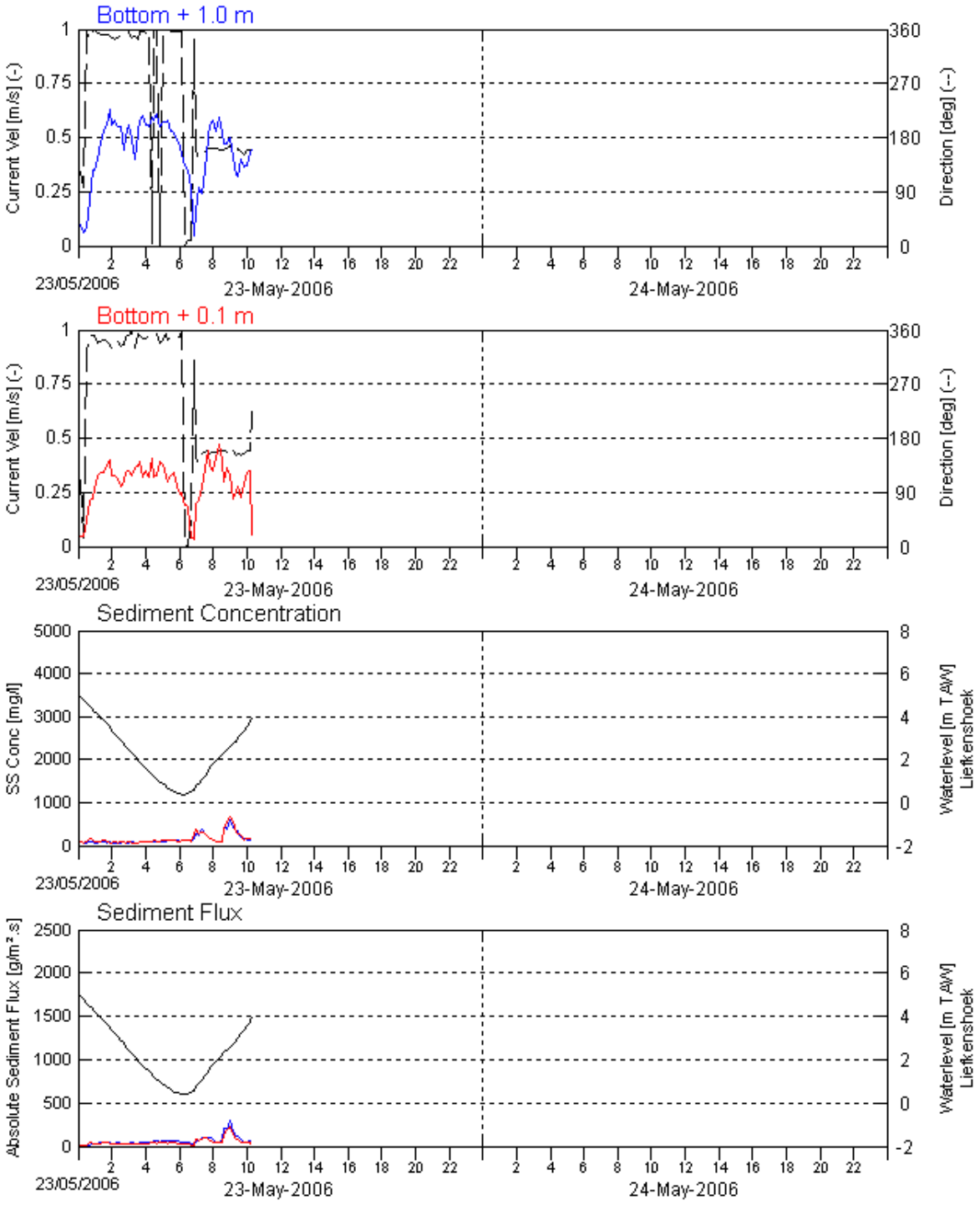
Date: 21/05/2006– 22/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok CDW

Date: 23/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060419	1	flood	3.8	0.3	171.1	0.3	168.6	289.7	313.2	97.9	80.3
20060420	1	ebb	4.9	0.3	107.8	0.2	120.6	138.5	139.6	33	27
20060420	2	flood	5	0.3	162.8	0.3	165.2	283.6	312.9	99.1	88.7
20060420	2	ebb	4.8	0.3	71.1	0.2	72.1	130	121.8	30.4	23.9
20060420	3	flood	4.4	0.3	164.8	0.3	159.4	211.3	211.3	67.9	58.6
20060421	3	ebb	4.6	0.3	79.2	0.2	61.9	125.5	153.2	28.7	28.6
20060421	4	flood	4.7	0.3	164.6	0.3	167.8	249.9	319.8	78.5	83.8
20060421	4	ebb	4.3	0.3	73.5	0.2	69.5	135.7	133.9	29.8	24.6
20060421	5	flood	4	0.2	158.2	0.2	167.1	170.7	175.9	48.2	44.7
20060422	5	ebb	4.2	0.3	70.3	0.2	63	88.6	97.9	20.7	18.6
20060422	6	flood	4.3	0.3	162.4	0.2	163.8	196.1	196	59.3	53
20060422	6	ebb	4.2	0.3	63.1	0.2	68.3	75.1	80.2	17.4	16.2
20060422	7	flood	3.8	0.2	162.1	0.2	150.1	123.7	123.5	33.3	29.4
20060423	7	ebb	4	0.2	62.2	0.2	60.8	72.4	79.1	16.4	15.6
20060423	8	flood	4.8	0.3	164.7	0.3	163.7	208.3	227.4	63	60.1
20060423	8	ebb	4.4	0.3	48.6	0.2	62.8	84.6	93.4	19.4	18
20060424	9	flood	4.2	0.3	167.3	0.2	157.6	159	156.5	46	38.4
20060424	9	ebb	4.7	0.3	45.7	0.2	50.5	69.5	71.1	16.7	14
20060424	10	flood	5	0.3	167.5	0.3	166.2	183.2	185.2	57.9	51.3
20060424	10	ebb	4.9	0.3	49	0.2	52.9	124.1	125.7	29.1	24.6
20060425	11	flood	4.8	0.3	154.7	0.3	156.7	208.3	237.5	68.1	63.6
20060425	11	ebb	5.3	0.3	67	0.2	102	119.4	114.1	27.6	23
20060425	12	flood	5.8	0.3	166.7	0.3	174.1	196.3	205.5	69.9	63.9

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060425	12	ebb	5.3	0.3	76.4	0.2	86.2	174.5	174.5	44.9	34.1
20060426	13	flood	5.3	0.3	157.9	0.3	156.9	340.6	451.4	118.7	132.3
20060426	13	ebb	5.6	0.3	73.3	0.2	69.2	156	154.9	37	29.8
20060426	14	flood	5.9	0.3	159.2	0.3	165.3	283.4	313.8	108.7	106.3
20060426	14	ebb	5.6	0.3	81	0.2	83.1	190.4	180.6	46.5	37
20060427	15	flood	5.5	0.3	159	0.3	157.6	484.4	520.4	161.3	133.9
20060427	15	ebb	6.1	0.3	63.9	0.2	59.5	167.4	168.2	40.5	33.3
20060427	16	flood	6.3	0.4	159.8	0.3	161.7	420.8	551.6	162.8	181.1
20060427	16	ebb	5.9	0.3	64.5	0.2	86.4	202.5	208.9	48.8	39.1
20060428	17	flood	5.8	0.3	157.9	0.3	159.6	411.1	435.8	144	149.6
20060428	17	ebb	6.1	0.3	63.7	0.2	62.1	203.1	228.1	47.8	40.7
20060428	18	flood	6.4	0.3	158.5	0.3	161	392.9	481.1	154.3	170.8
20060428	18	ebb	6	0.3	68.6	0.2	85.9	206.6	222.8	51.9	46
20060429	19	flood	6	0.3	156.2	0.3	150.2	476.7	746.9	180.1	221.9
20060429	19	ebb	6.2	0.3	69.9	0.2	77.1	257.5	299.7	56.5	51
20060429	20	flood	6.1	0.3	157.2	0.3	160.9	350.5	378.3	130.6	113.3
20060429	20	ebb	6	0.3	95.6	0.2	135.6	182.4	196.9	44.8	40.5
20060430	21	flood	5.9	0.3	160.5	0.3	158	330.2	415.1	130	142.5
20060430	21	ebb	6.1	0.3	64.8	0.2	84.8	199.2	196.8	45.2	35.3
20060430	22	flood	5.9	0.3	158.9	0.3	158.3	228.5	870.7	77.8	238.2
20060501	22	ebb	5.9	0.3	62.7	0.2	69.5	193.7	191.5	39.6	31.2
20060501	23	flood	5.8	0.3	155.2	0.3	157.9	176.8	204.6	64	65.8
20060501	23	ebb	5.8	0.3	95.7	0.2	74.4	168.7	177.4	37.2	28.7
20060501	24	flood	5.5	0.3	156.9	0.3	160.1	210.5	197.9	82.1	67.3
20060502	24	ebb	5.4	0.3	76.2	0.2	82	196.1	218	41	37.7

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060502	25	flood	5.6	0.3	159	0.3	162.4	208	313.9	70.6	99.8
20060502	25	ebb	5.3	0.3	82.1	0.2	54	167.7	215	40.1	39.2
20060502	26	flood	5	0.3	161.6	0.3	162.7	236.6	259.1	75.3	74.2
20060503	26	ebb	5.4	0.3	57	0.2	67.5	137.4	160.6	33.7	32.8
20060503	27	flood	5.2	0.3	159.9	0.3	158.4	260.7	287.2	85	85.4
20060503	27	ebb	4.8	0.3	98.8	0.2	84	175.6	175.6	39	33.6
20060503	28	flood	4.8	0.3	155	0.2	158.6	306.9	335	94	85.8
20060504	28	ebb	4.9	0.3	66.3	0.2	83.1	138.8	262.7	31.8	30.7
20060504	29	flood	4.8	0.3	161.6	0.3	167.6	401.1	439.8	124.7	115.2
20060504	29	ebb	4.2	0.2	65.4	0.2	62.2	190.4	190.2	41.7	33.7
20060504	30	flood	3.5	0.3	164.4	0.2	163.2	215.4	244.2	68.2	49.7
20060505	30	ebb	4.4	0.4	216	0.3	193.4	107.5	121.9	37.9	30.2
20060505	31	flood	4.4	0.3	154.3	0.2	163.3	295.4	386.1	91.3	82.2
20060505	31	ebb	4	0.4	214.8	0.2	210.8	154.5	165.7	50.9	37.3
20060505	32	flood	3.7	0.3	150.6	0.2	153	187.9	216.9	52.6	39.5
20060506	32	ebb	3.8	0.3	204.4	0.3	187.3	104.9	115.1	32.7	26.5
20060506	33	flood	4.1	0.3	159.4	0.2	160.8	232.1	275.5	73.8	52.9
20060506	33	ebb	3.9	0.4	157.3	0.3	136.1	98.5	107.2	31.7	25.9
20060506	34	flood	3.5	0.2	176.8	0.2	174.9	133	145	33.8	24.9
20060507	34	ebb	3.8	0.3	216.9	0.3	129.1	68.4	76.1	21.6	17.6
20060507	35	flood	4.1	0.3	175.5	0.2	156.8	172.9	177.8	54.8	39.6
20060507	35	ebb	3.9	0.4	165.2	0.3	126.6	91.6	92.4	28.7	22
20060507	36	flood	3.8	0.3	165.1	0.2	165	122.6	138	35.2	26.1
20060508	36	ebb	4.2	0.4	168.8	0.3	135.6	68.1	72.1	25.7	20.6
20060508	37	flood	4.5	0.3	152.9	0.2	166.4	149	179.4	48.2	39.4

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060508	37	ebb	4.3	0.4	246.2	0.3	168.5	100.9	108.8	34.7	26.1
20060509	38	flood	4.3	0.3	143.9	0.2	144.4	172.1	210.2	50.5	43.1
20060509	38	ebb	4.4	0.4	236.4	0.3	220.8	107.2	111.5	36.1	26.5
20060509	39	flood	4.8	0.3	168	0.2	168.8	181.9	222.7	57	48.2
20060509	39	ebb	4.6	0.4	211.6	0.3	190.2	118.9	135.2	39.9	32.3
20060510	40	flood	4.5	0.3	146.4	0.2	150.6	207.2	253.6	68.3	54.3
20060510	40	ebb	4.9	0.4	261.1	0.3	185.2	114.6	120	39.1	29.9
20060510	41	flood	5.1	0.3	151.1	0.2	155.8	217.8	230.5	74.9	52.9
20060510	41	ebb	5	0.4	248.6	0.3	181.9	142.9	150.4	46.6	34.9
20060511	42	flood	4.9	0.3	159.5	0.2	152.9	251.5	340.7	78.6	73.7
20060511	42	ebb	5.2	0.4	222.7	0.3	181.2	155.6	182	54.6	43.9
20060511	43	flood	5.3	0.3	156.3	0.2	160.9	334.4	395.2	118.1	93.9
20060511	43	ebb	5.2	0.4	285	0.3	217.5	190.1	210.1	60.4	52.1
20060512	44	flood	5.2	0.3	167.4	0.2	161.2	265.7	289.6	94.8	70.2
20060512	44	ebb	5.4	0.4	293.1	0.3	206.6	169.5	181.6	62	45.7
20060512	45	flood	5.5	0.4	160.8	0.2	152.4	248.7	304	91	82
20060512	45	ebb	5.4	0.4	289.2	0.3	203.1	219.1	276.2	64.2	61.5
20060513	46	flood	5.4	0.3	152.2	0.2	153.3	383.3	484.3	130.8	105.4
20060513	46	ebb	5.5	0.4	266.5	0.3	207.6	198.4	235.9	66.9	60.2
20060513	47	flood	5.7	0.4	150.5	0.2	155.1	288	312.7	103.8	76.2
20060513	47	ebb	5.5	0.4	302.4	0.3	210	188	198.8	64	50.7
20060514	48	flood	5.4	0.4	161.4	0.2	155.1	247.4	247.1	95.2	68.4
20060514	48	ebb	5.6	0.4	275.8	0.3	188.8	146.6	152.3	50.8	38.5
20060514	49	flood	5.6	0.4	160.6	0.2	151.7	219.1	228.3	85.1	55.3
20060514	49	ebb	5.7	0.4	299.6	0.3	167.6	134.8	150.8	45.3	35.7

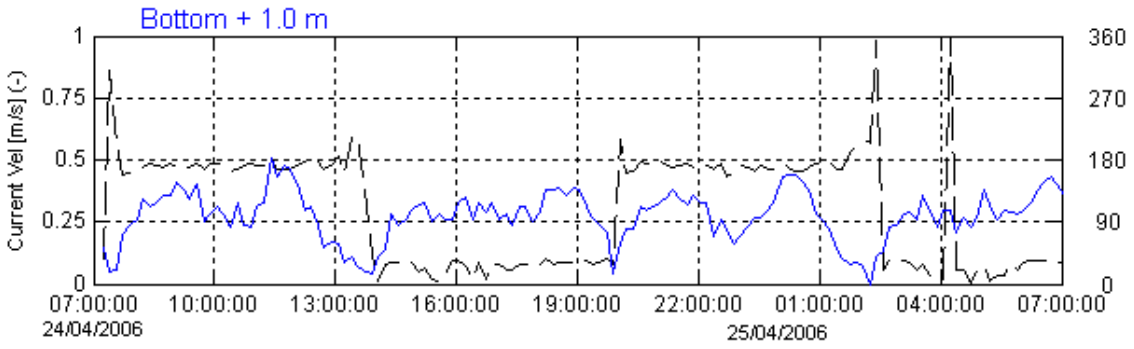
RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

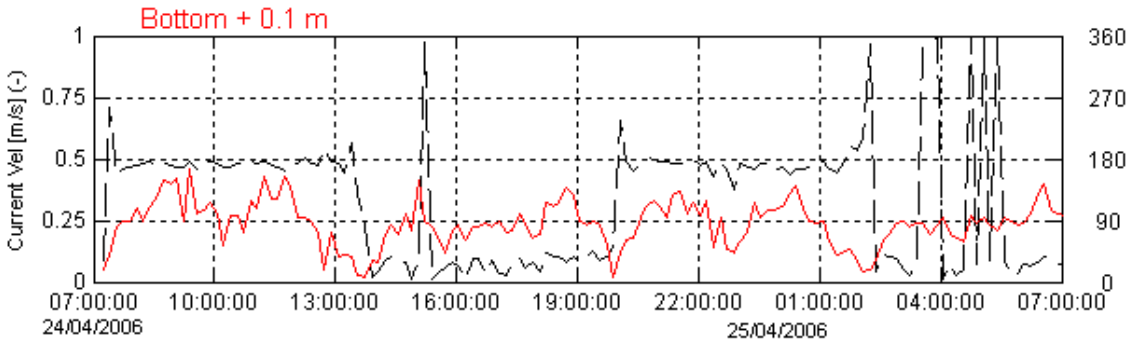
Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060515	50	flood	5.5	0.3	149.4	0.2	152.6	194.5	196.4	70.7	46.6
20060515	50	ebb	5.6	0.4	293.1	0.3	183	151.4	156.7	54.1	39.7
20060515	51	flood	5.6	0.4	157	0.2	150.6	181.2	189.2	70.5	48.5
20060515	51	ebb	5.4	0.4	283.2	0.3	227.9	154.7	163	48.4	39.1
20060516	52	flood	5.6	0.4	145.6	0.2	150.6	230.8	242.8	85.8	63.1
20060516	52	ebb	5.5	0.4	278.9	0.3	214.3	172.3	179.6	59.5	43.8
20060516	53	flood	5.4	0.3	157.4	0.2	149.7	289.4	309.2	104.1	72
20060517	53	ebb	5.5	0.4	299.5	0.3	201.9	164.4	189.2	54.4	48.1
20060517	54	flood	5.5	0.4	160	0.2	162.9	288.7	356.4	106	87.7
20060517	54	ebb	5.5	0.3	280.6	0.2	266.5	210.6	218	64.2	47.4
20060517	55	flood	5.1	0.4	145.9	0.3	147	299.6	335.6	118.7	102.3
20060518	55	ebb	5.4	0.5	307.9	0.3	320.6	187.5	205.6	71	50.5
20060518	56	flood	5.6	0.4	163.7	0.3	154.3	385.1	563.2	166.6	168.1
20060518	56	ebb	5.1	0.5	296.7	0.3	305.8	275.7	302.5	111.1	81.4
20060518	57	flood	4.9	0.4	145.6	0.3	166.3	402.1	487.4	158.3	138.9
20060519	57	ebb	5.2	0.5	315.1	0.3	319.6	216.7	226.7	83.1	55.7
20060519	58	flood	5.4	0.4	153.2	0.3	154.4	490.2	508.4	211.6	171.5
20060519	58	ebb	4.3	0.4	281	0.3	297.4	221.6	244	84.5	58.1
20060519	59	flood	4.3	0.4	182.8	0.3	173.3	289	339.1	100.3	87.1
20060520	59	ebb	5.2	0.5	295.2	0.3	293.5	157	191.8	64.3	47.3
20060520	60	flood	4.9	0.4	145.4	0.3	146.8	418.4	527.6	162.5	144.5
20060520	60	ebb	4.3	0.4	252.9	0.3	279	193	215.1	69.3	49.6
20060520	61	flood	4.6	0.4	173	0.3	162.9	402.4	433.5	159.6	132.2
20060521	61	ebb	4.9	0.5	289.5	0.3	296.4	121	153.1	47.4	38.1
20060521	62	flood	4.8	0.4	156.6	0.3	159.2	276.9	312.7	109.9	90.1

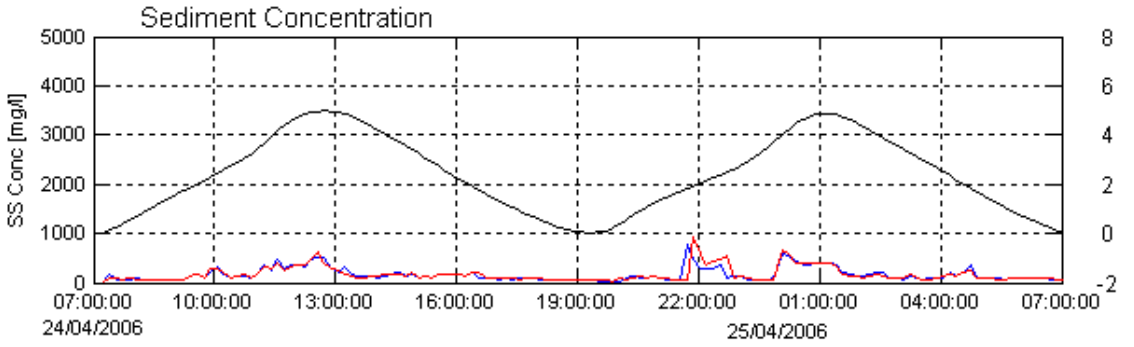
RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

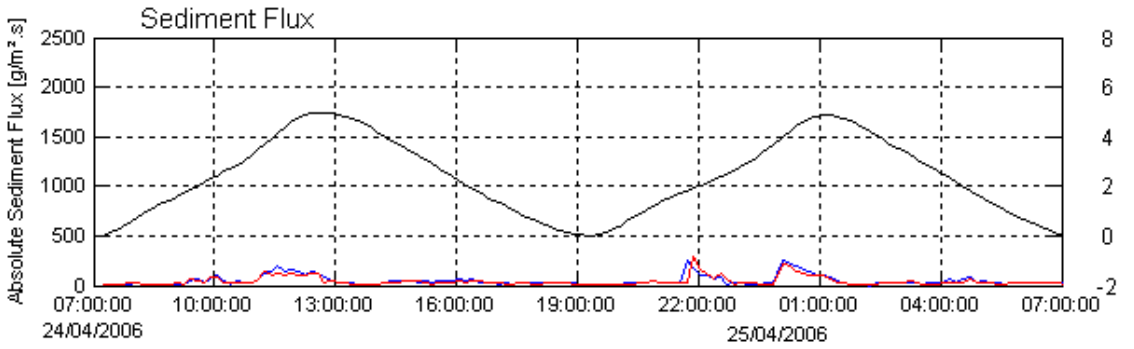
Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +1.0m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060521	62	ebb	5	0.4	245.9	0.3	298.1	149.8	154.5	63.6	42.1
20060521	63	flood	4.6	0.4	160.1	0.3	157	276.3	316.4	112.5	90.3
20060522	63	ebb	4.9	0.5	300.2	0.3	299.1	116.1	124.1	47.1	31.8
20060522	64	flood	5.2	0.4	161.5	0.3	164.7	230.1	270.2	98.8	85
20060522	64	ebb	4.5	0.4	258.4	0.3	241.7	190.6	217.3	74.8	53.5
20060522	65	flood	4.7	0.4	151.3	0.3	172.3	238.1	295.8	88.8	81.3
20060523	65	ebb	4.9	0.5	304.3	0.3	312.6	93.2	105.1	41	28.8

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006









Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:	Date:
Deurganckdok CDW	Avg Tide 24/04– 25/04

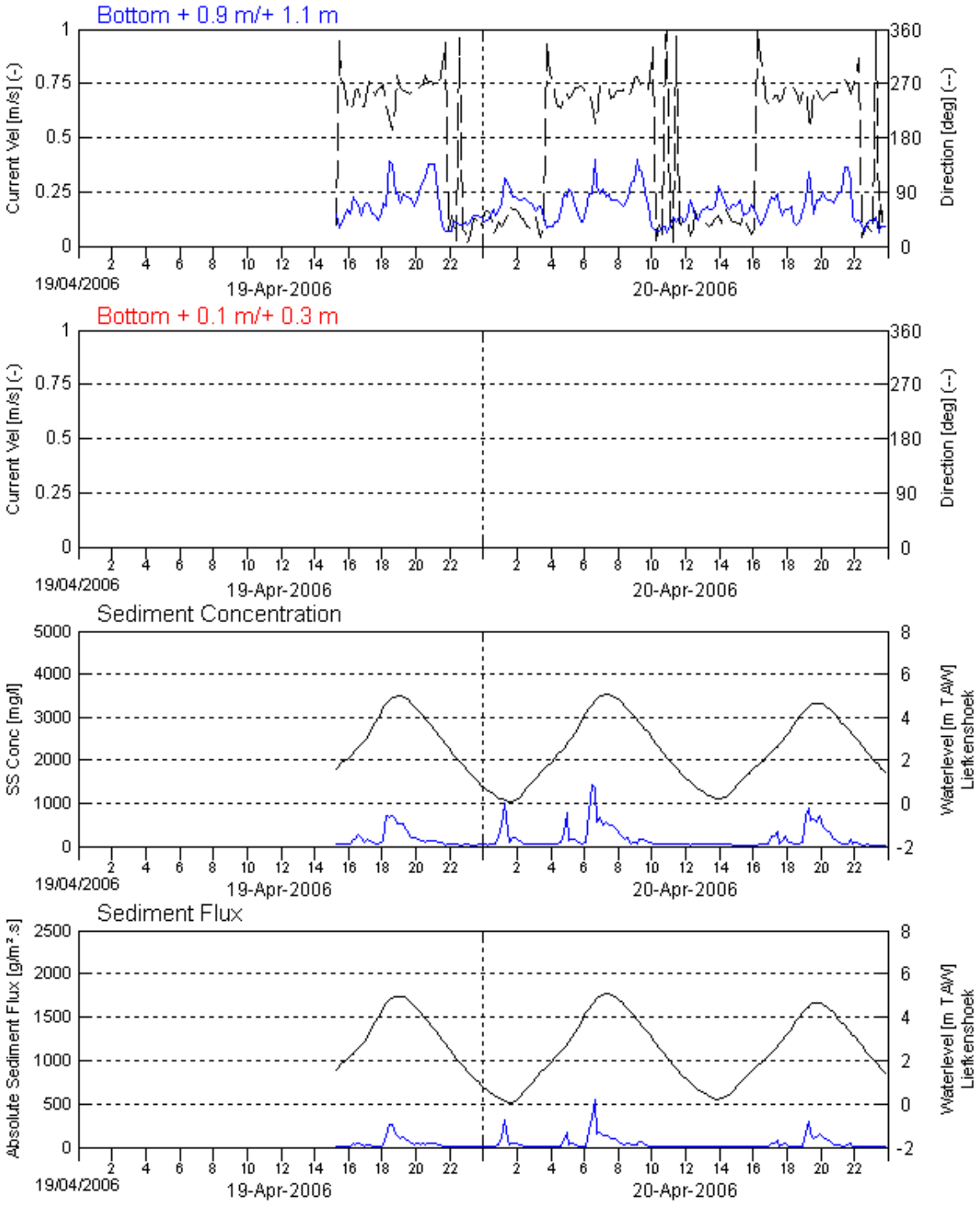
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

D.2 Sill Frame

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

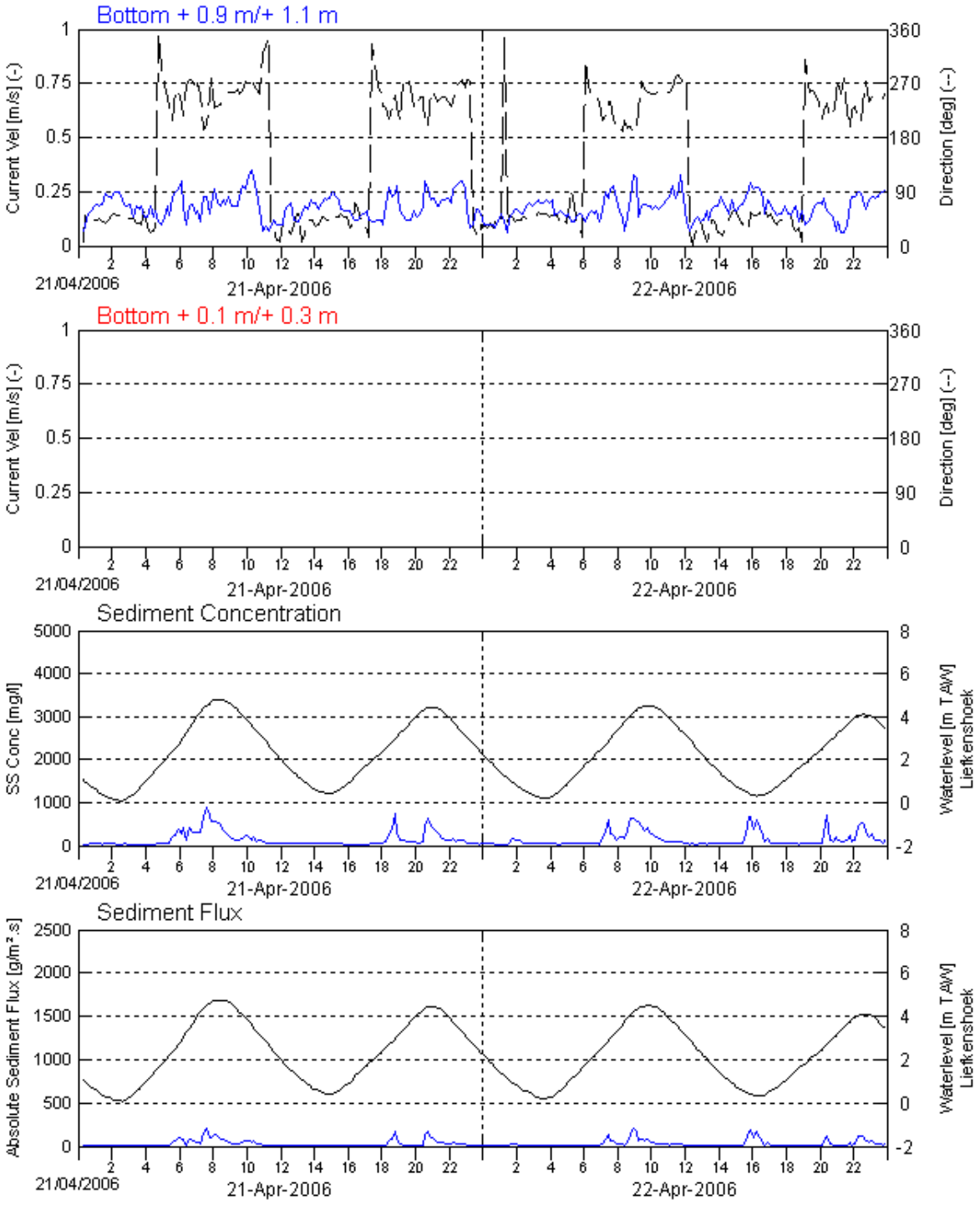
Date:
19/04/2006– 20/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

Date: 21/04/2006– 22/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

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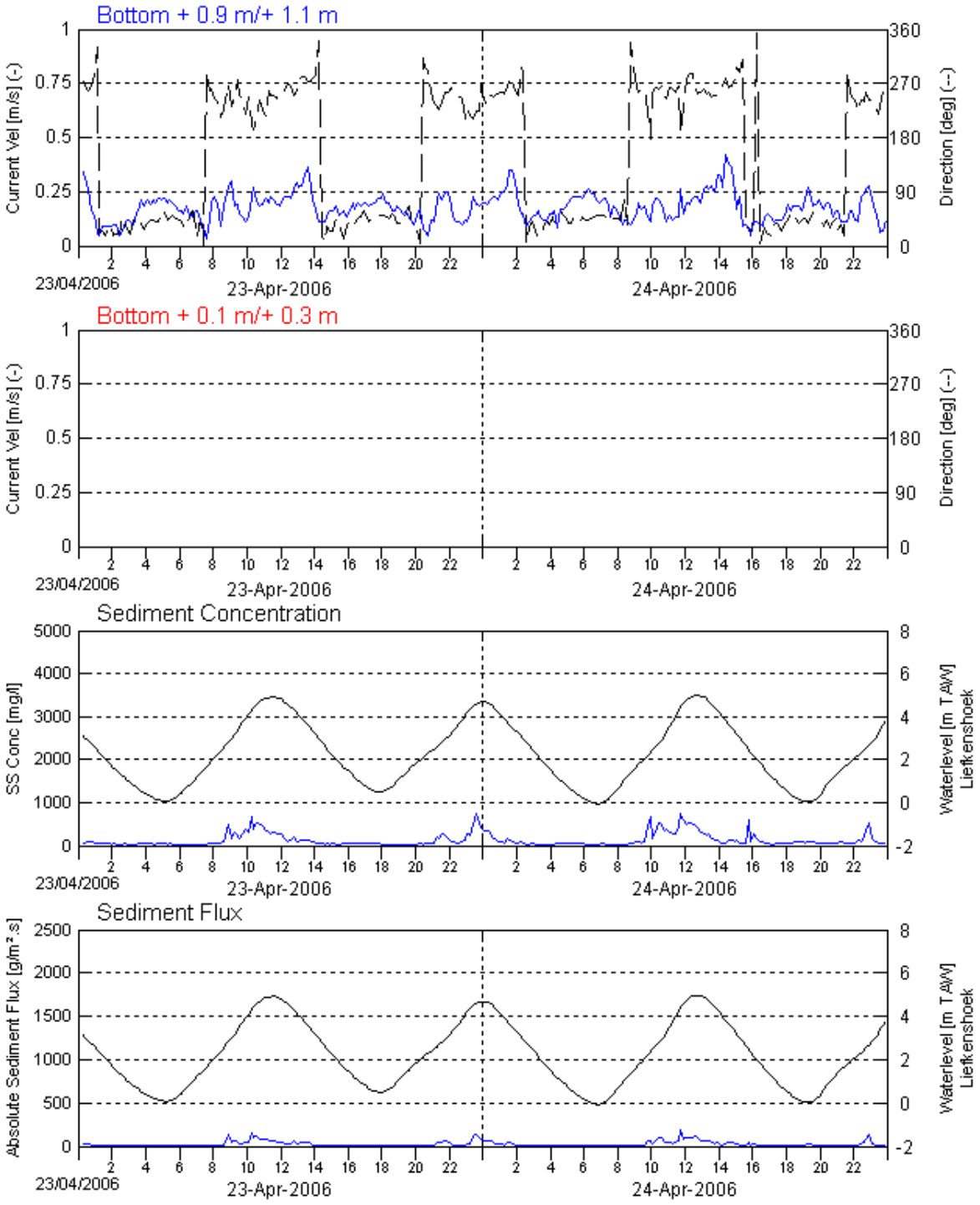
11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

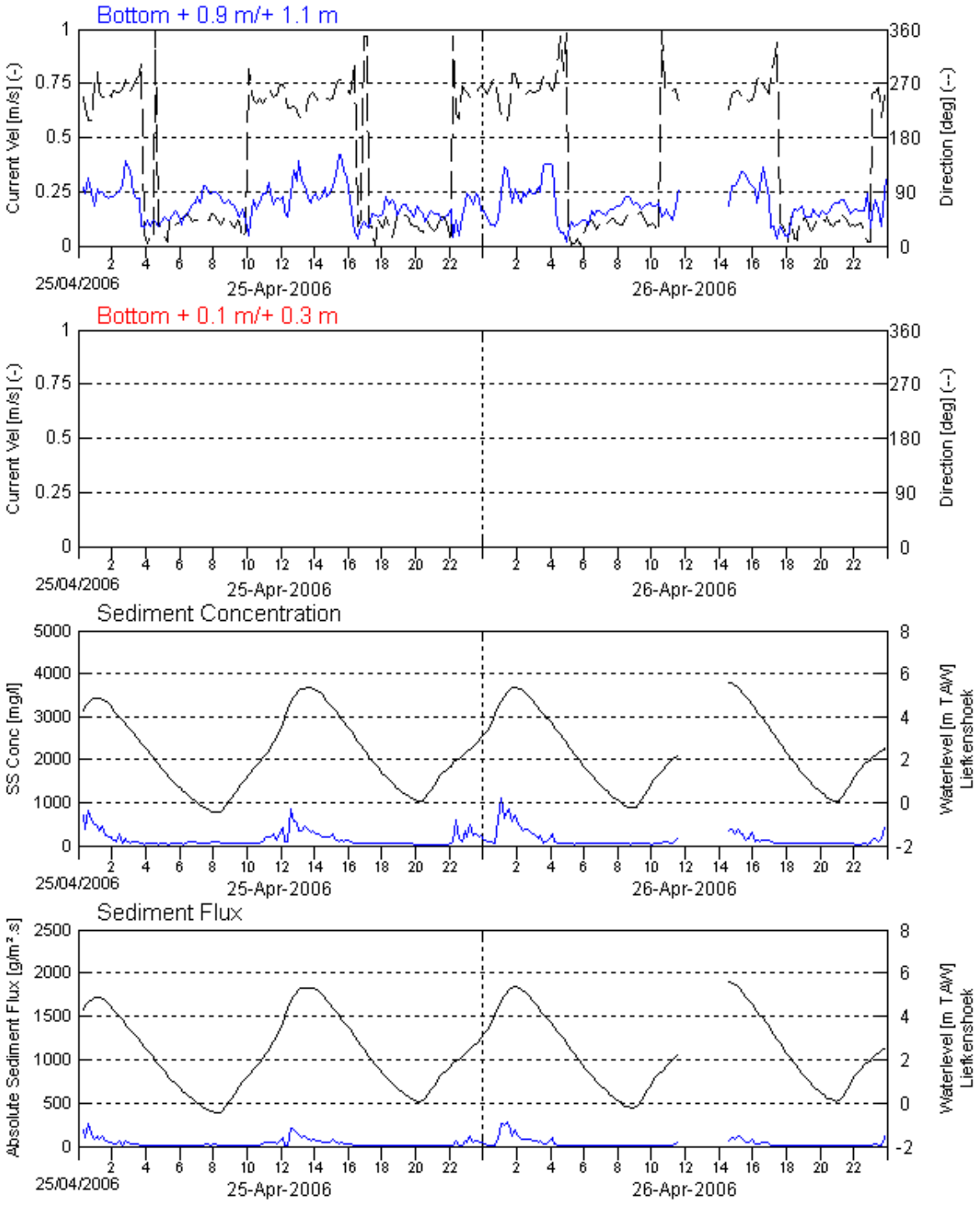
Date:
23/04/2006– 24/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

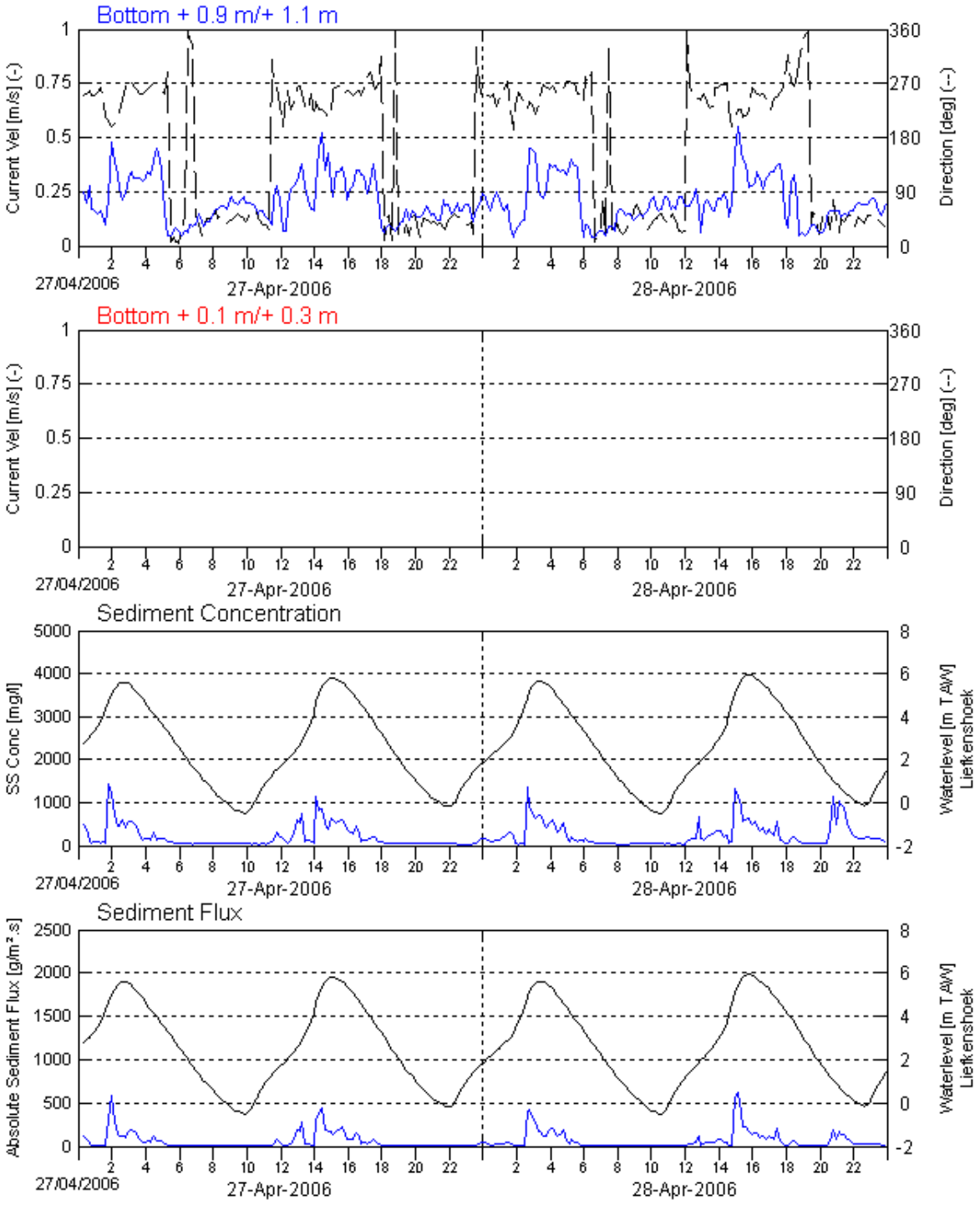
Date:
25/04/2006– 26/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

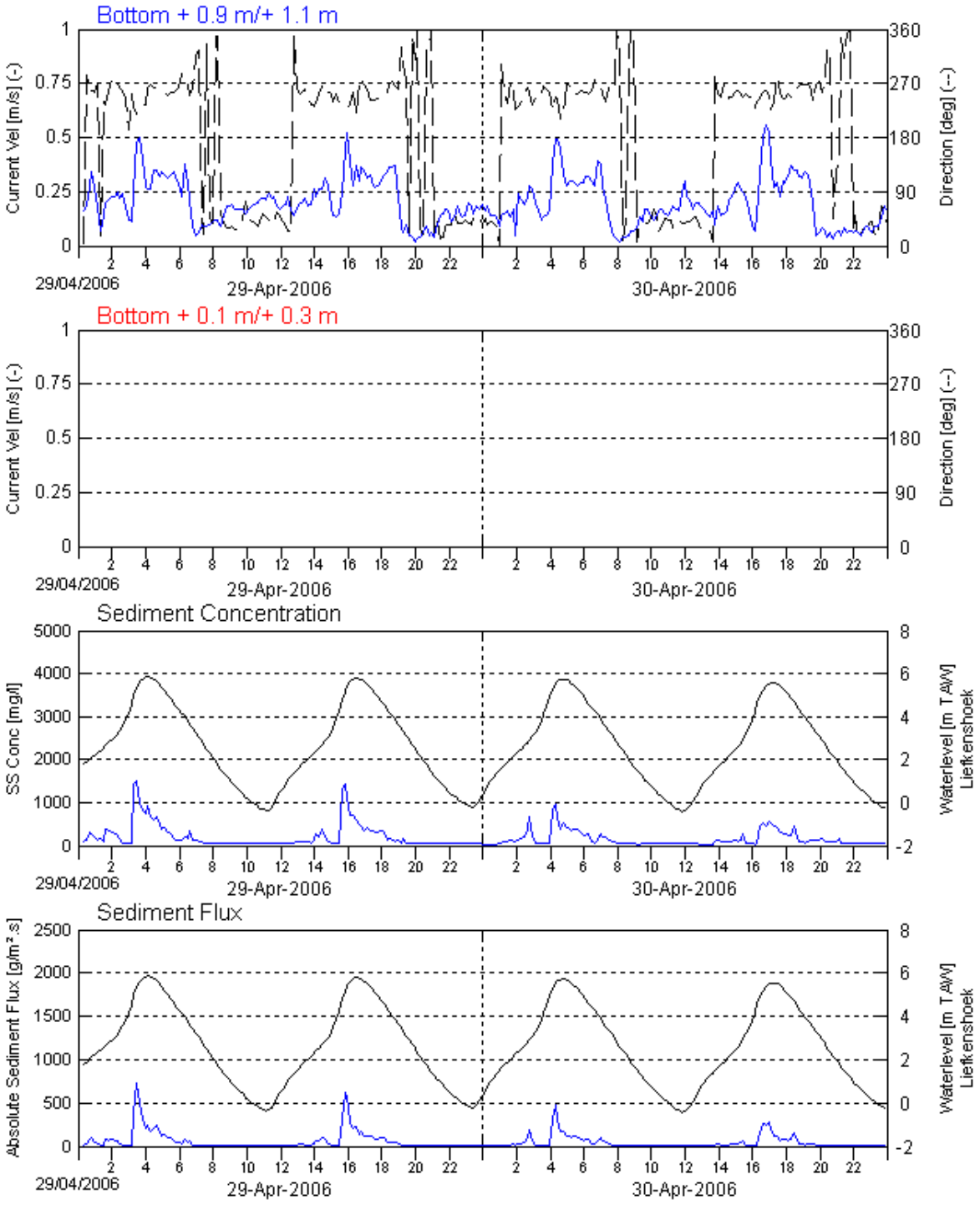
Date:
27/04/2006– 28/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

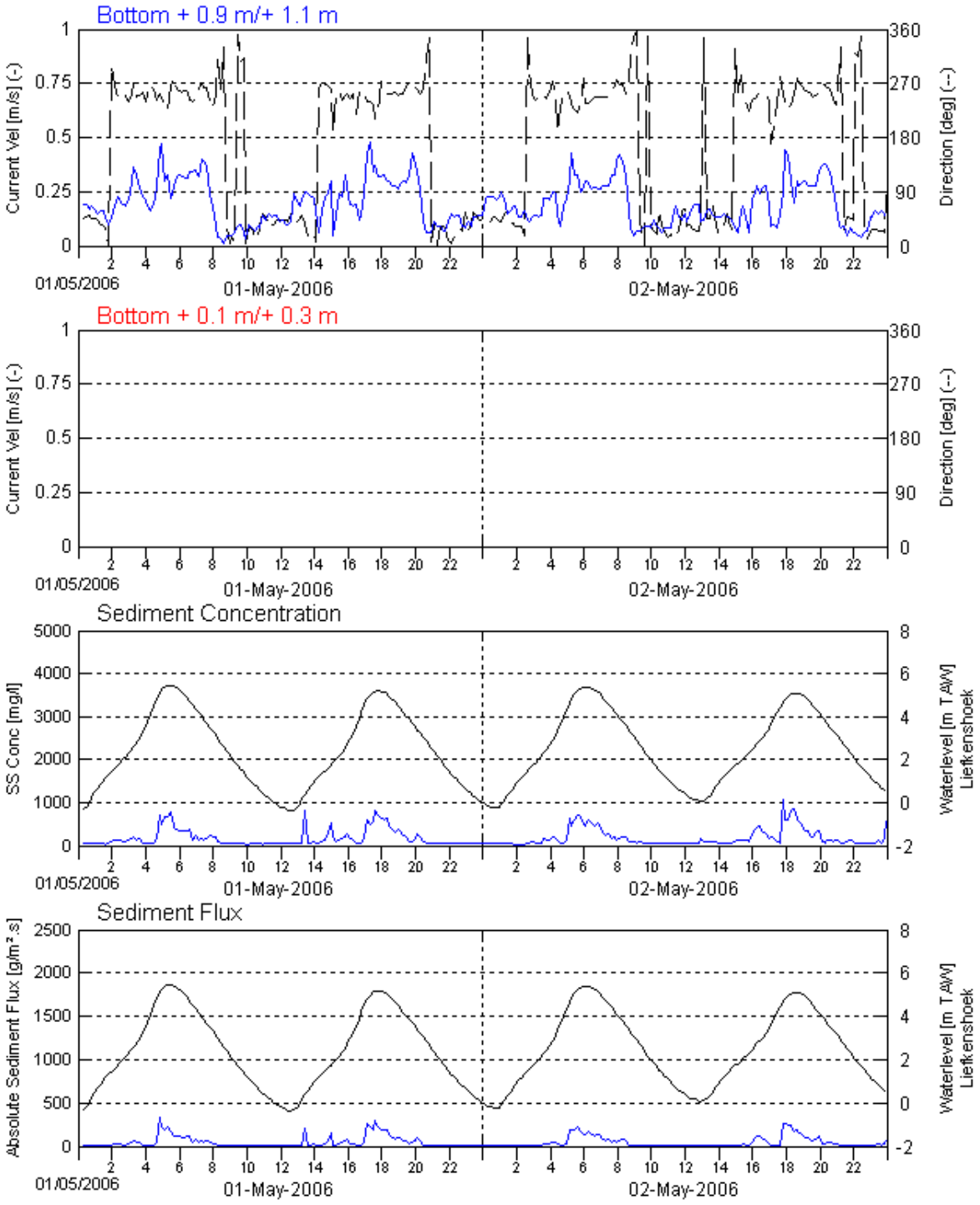
Date:
29/04/2006– 30/04/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

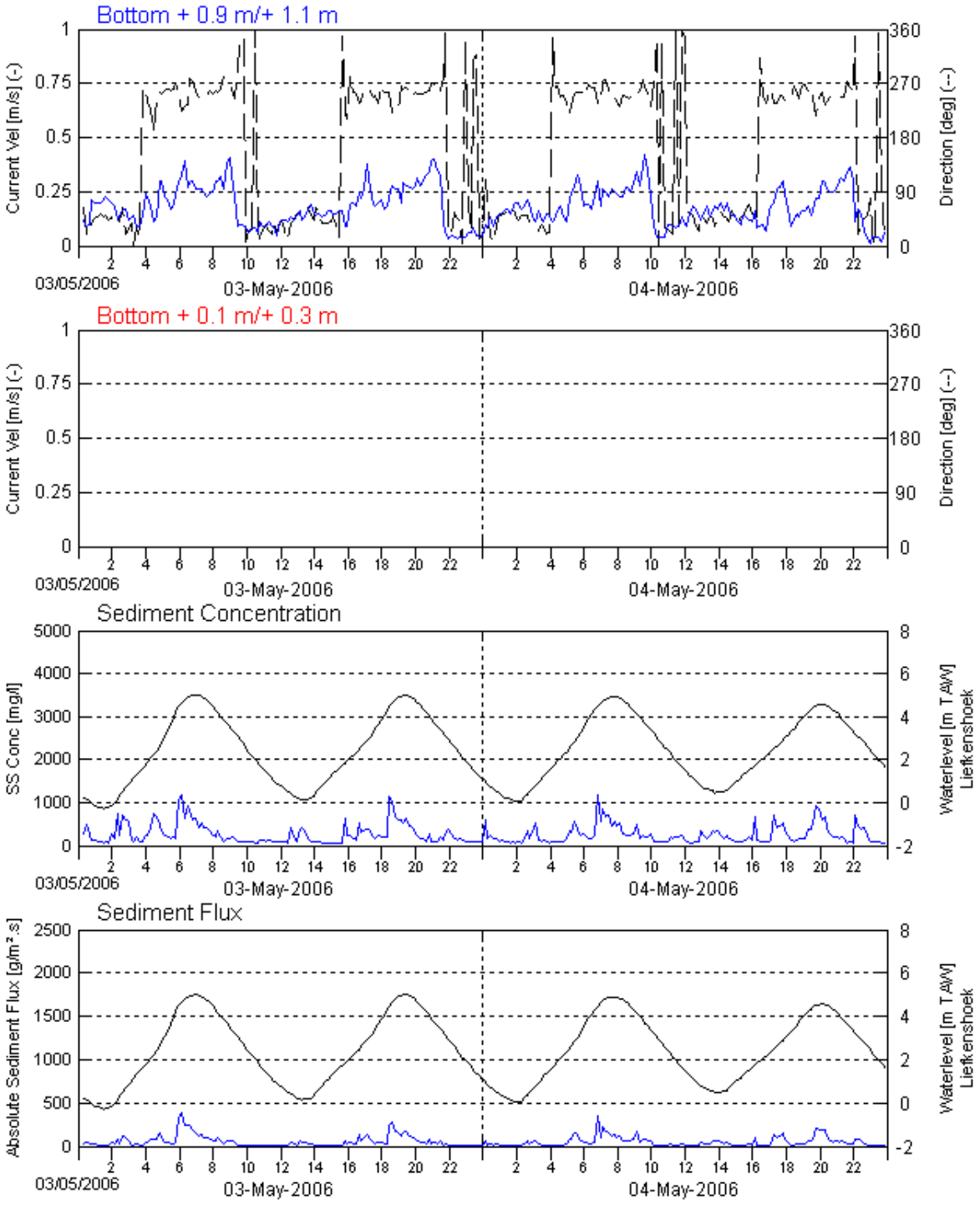
Date:
01/05/2006– 02/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

Date: 03/05/2006– 04/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

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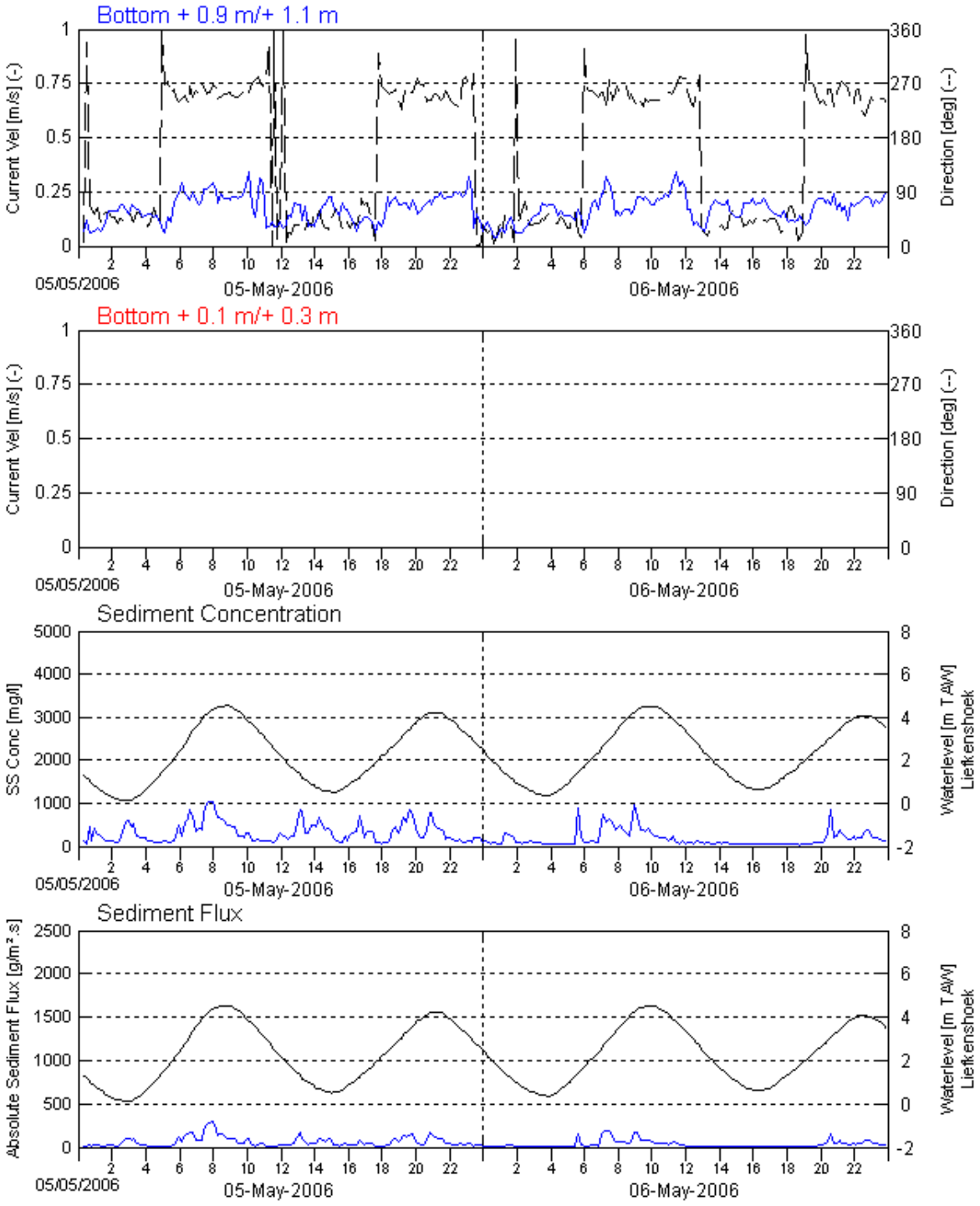
11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

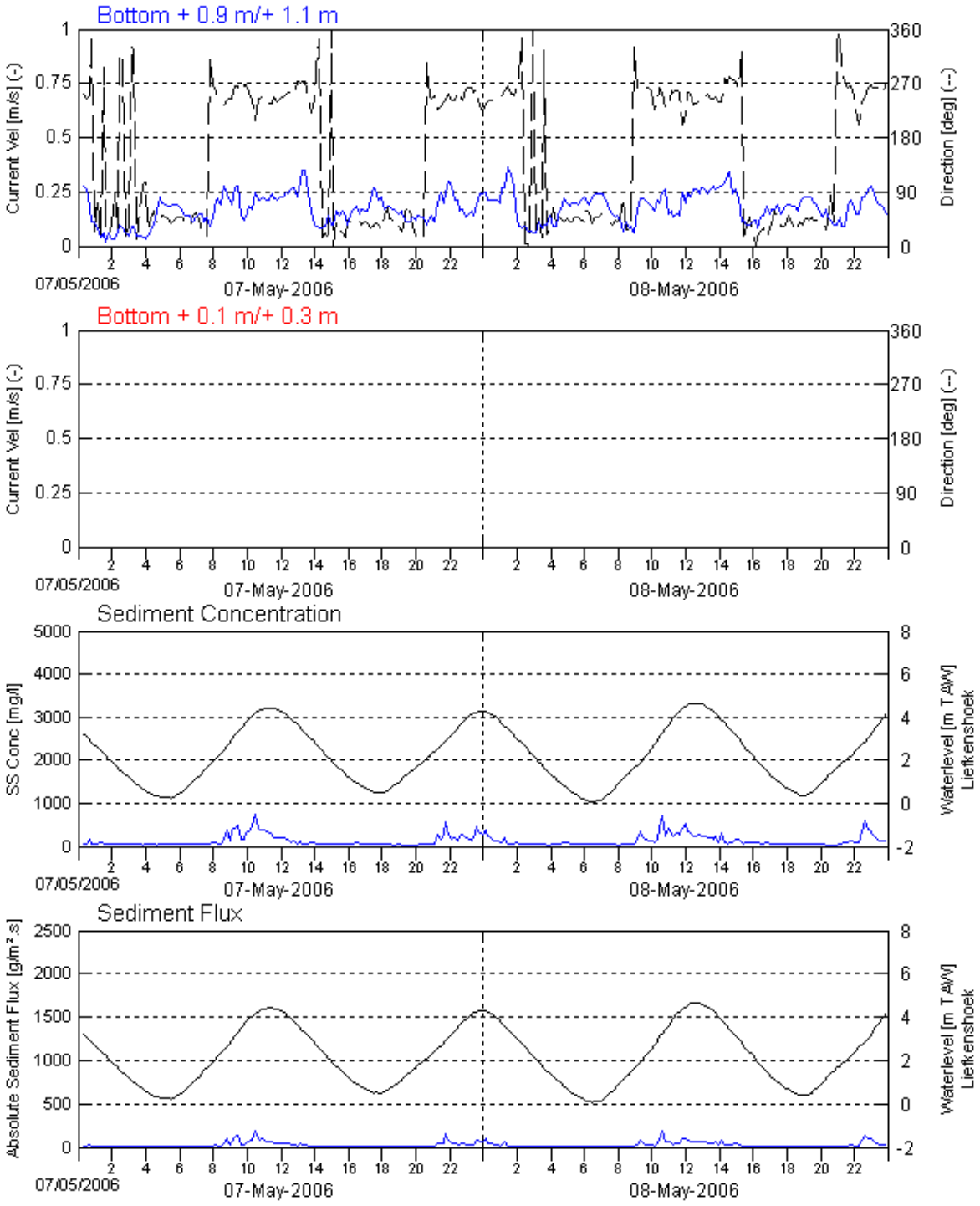
Location:	Date:
Deurganckdok Sill	05/05/2006– 06/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

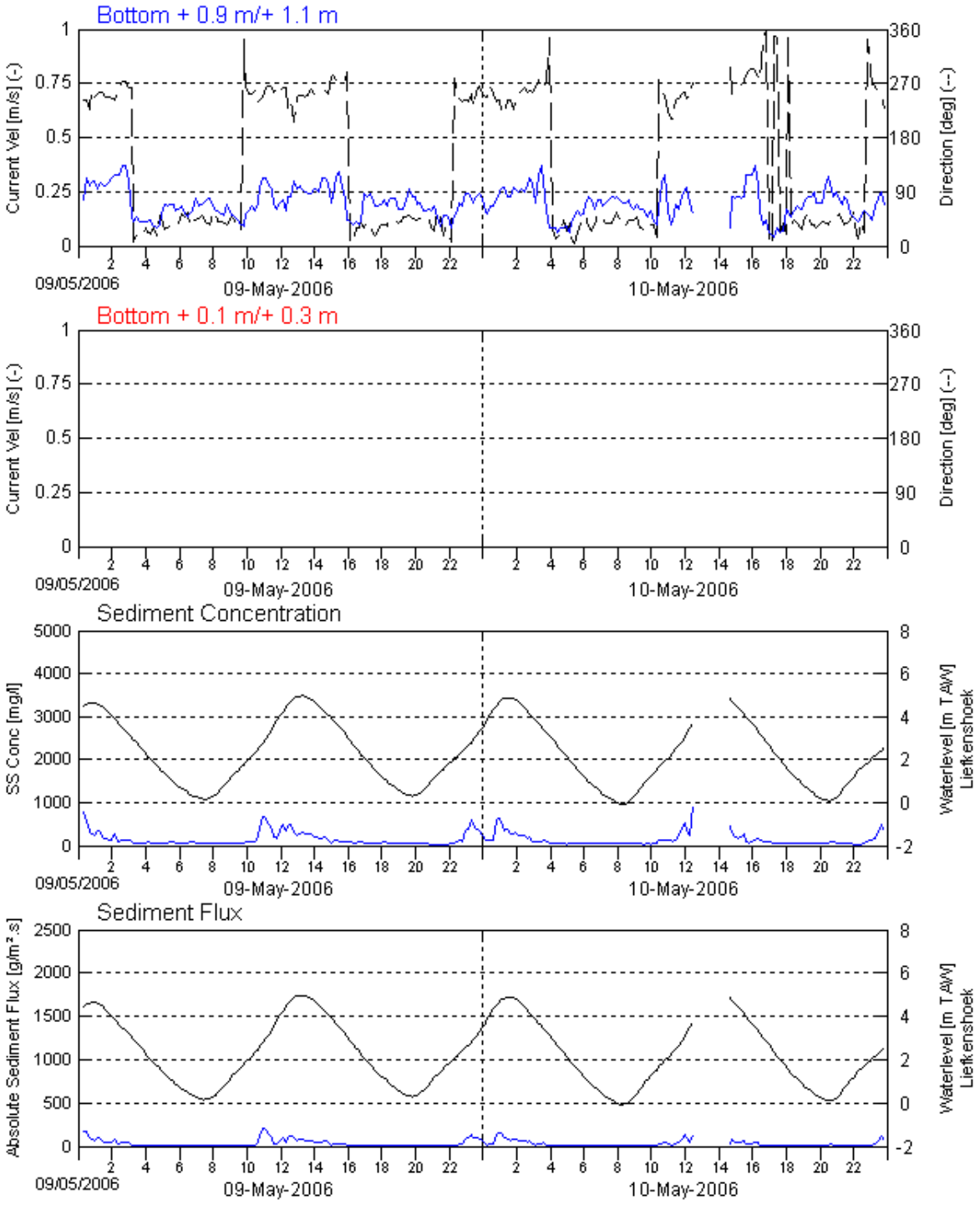
Location:	Date:
Deurganckdok Sill	07/05/2006– 08/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

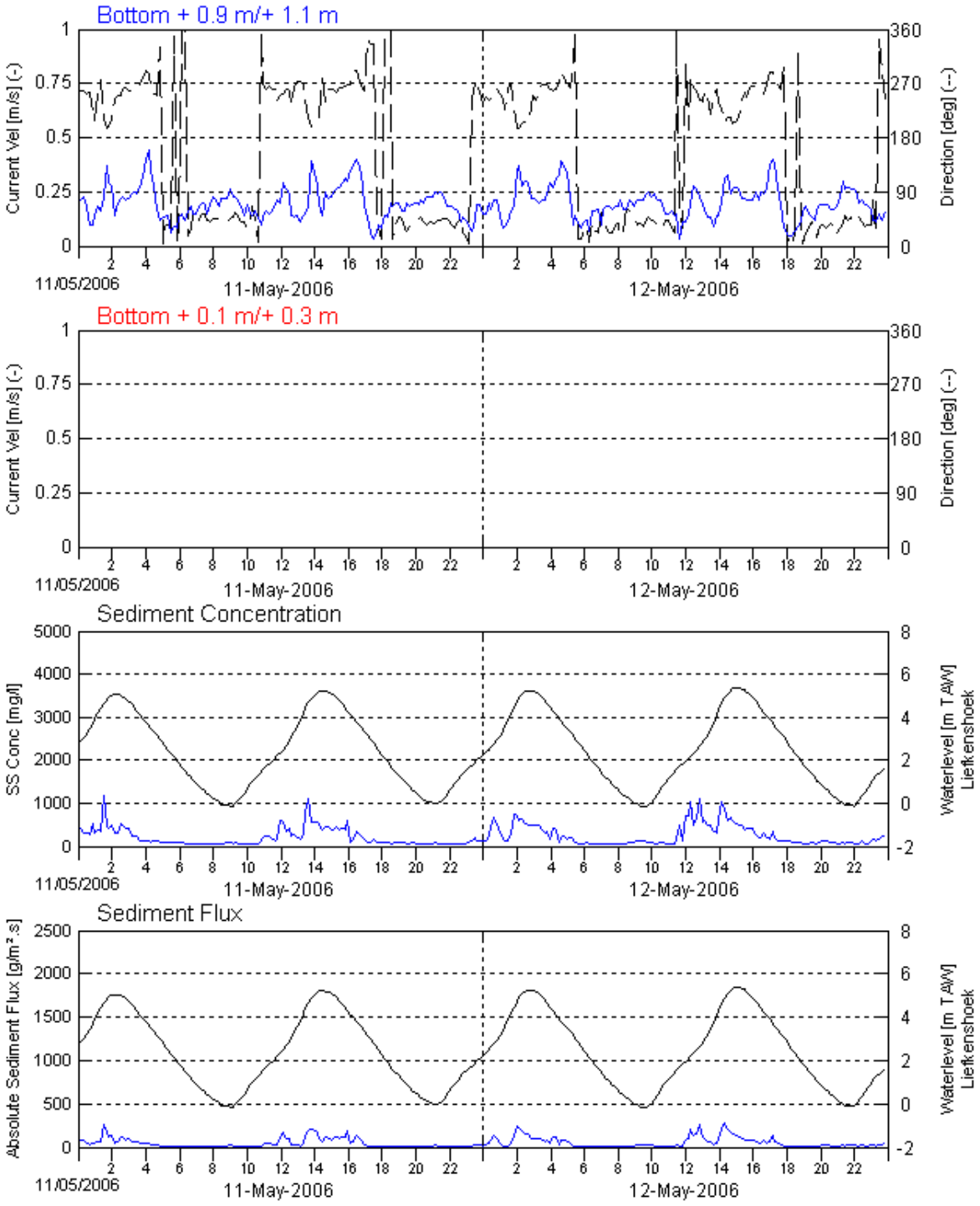
Date: 09/05/2006– 10/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

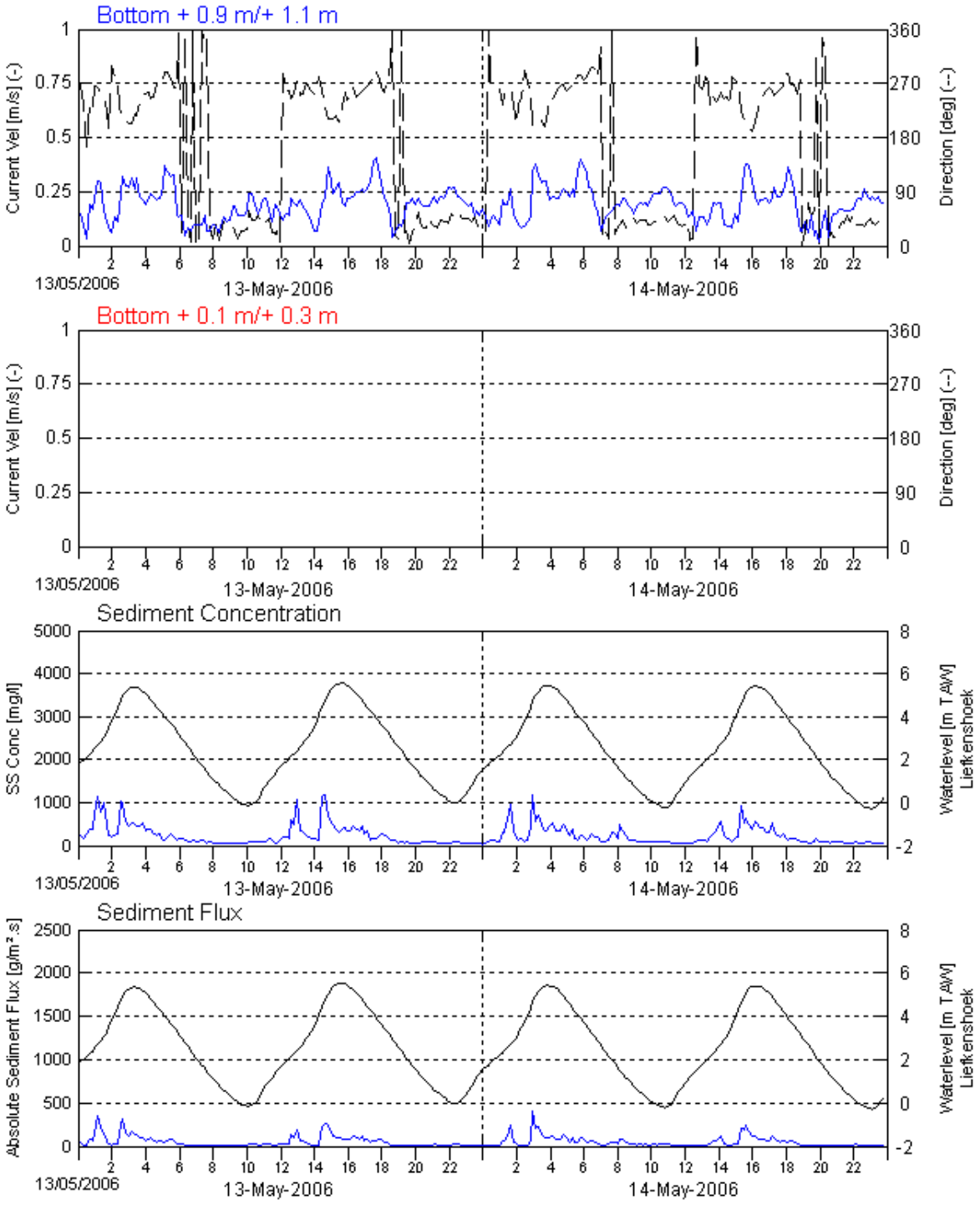
Date: 11/05/2006– 12/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

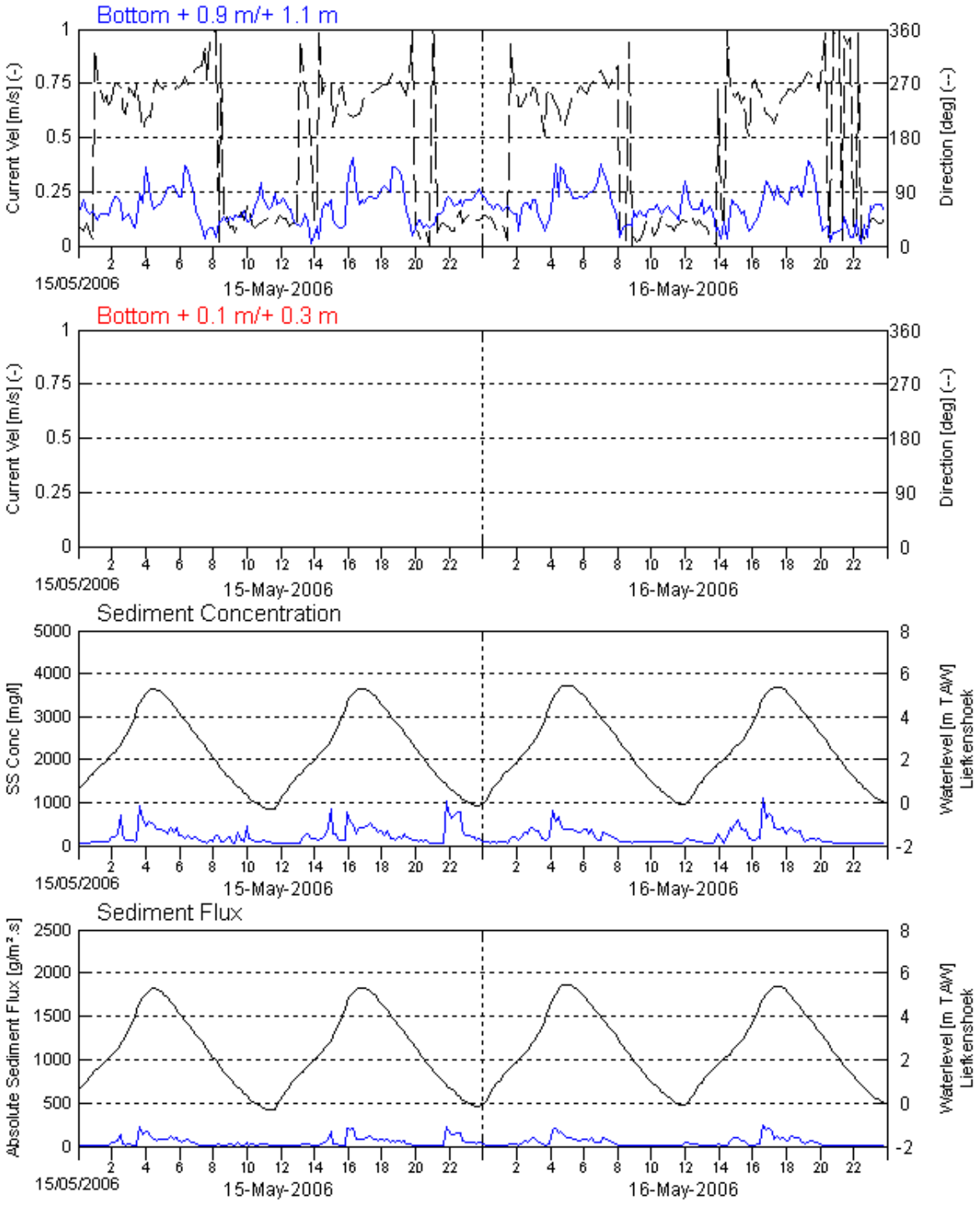
Date:
13/05/2006– 14/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

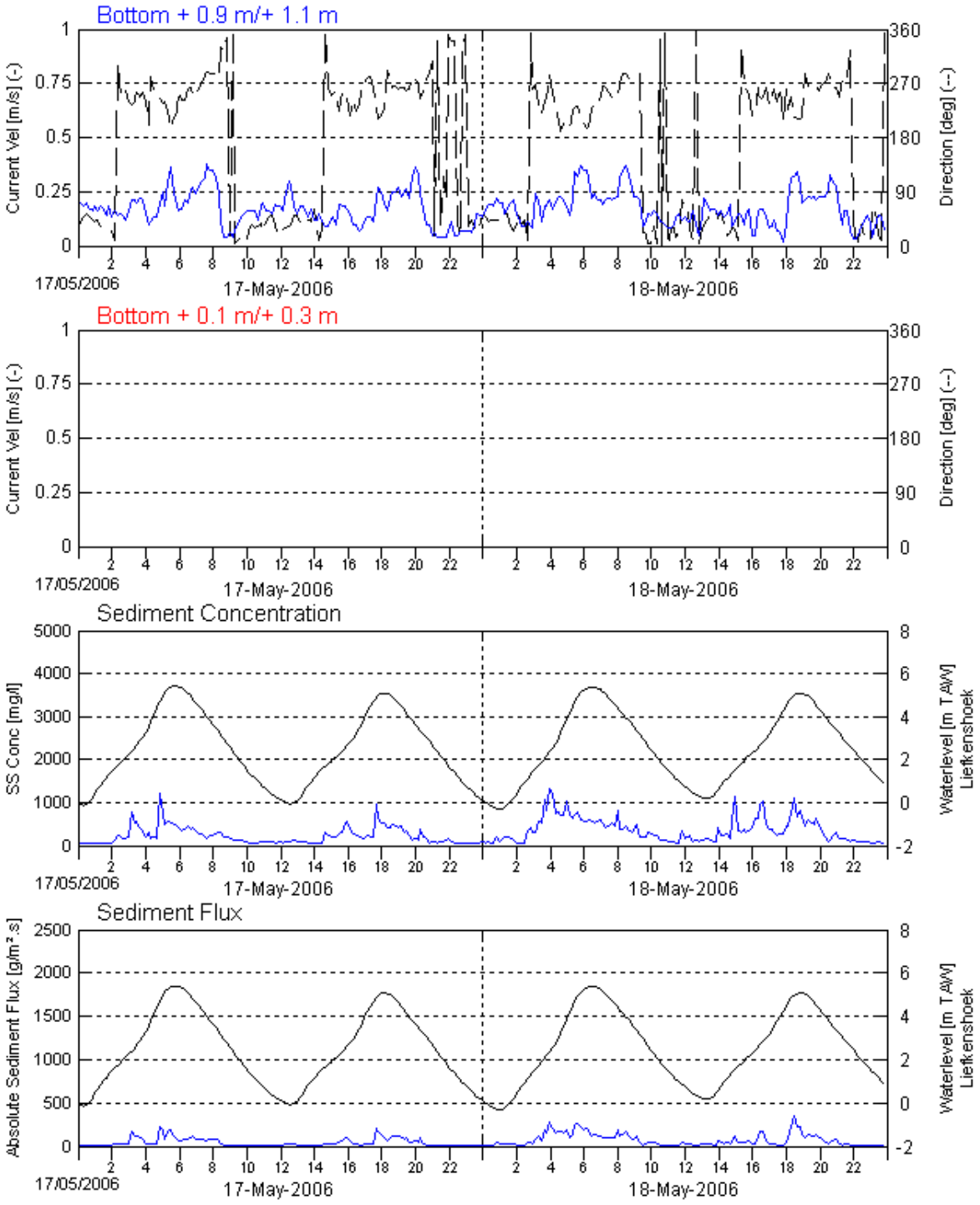
Date:
15/05/2006– 16/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

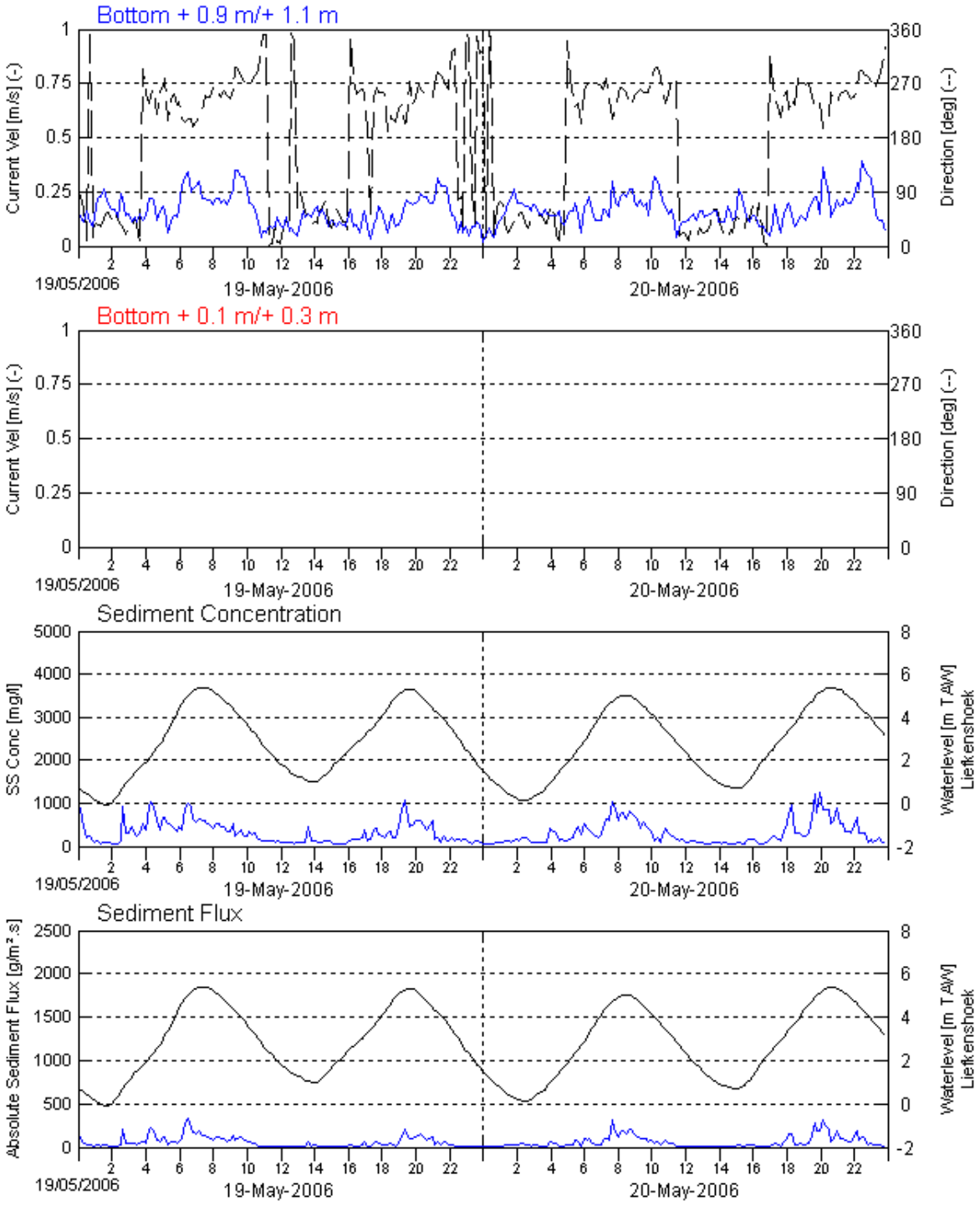
Date: 17/05/2006– 18/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

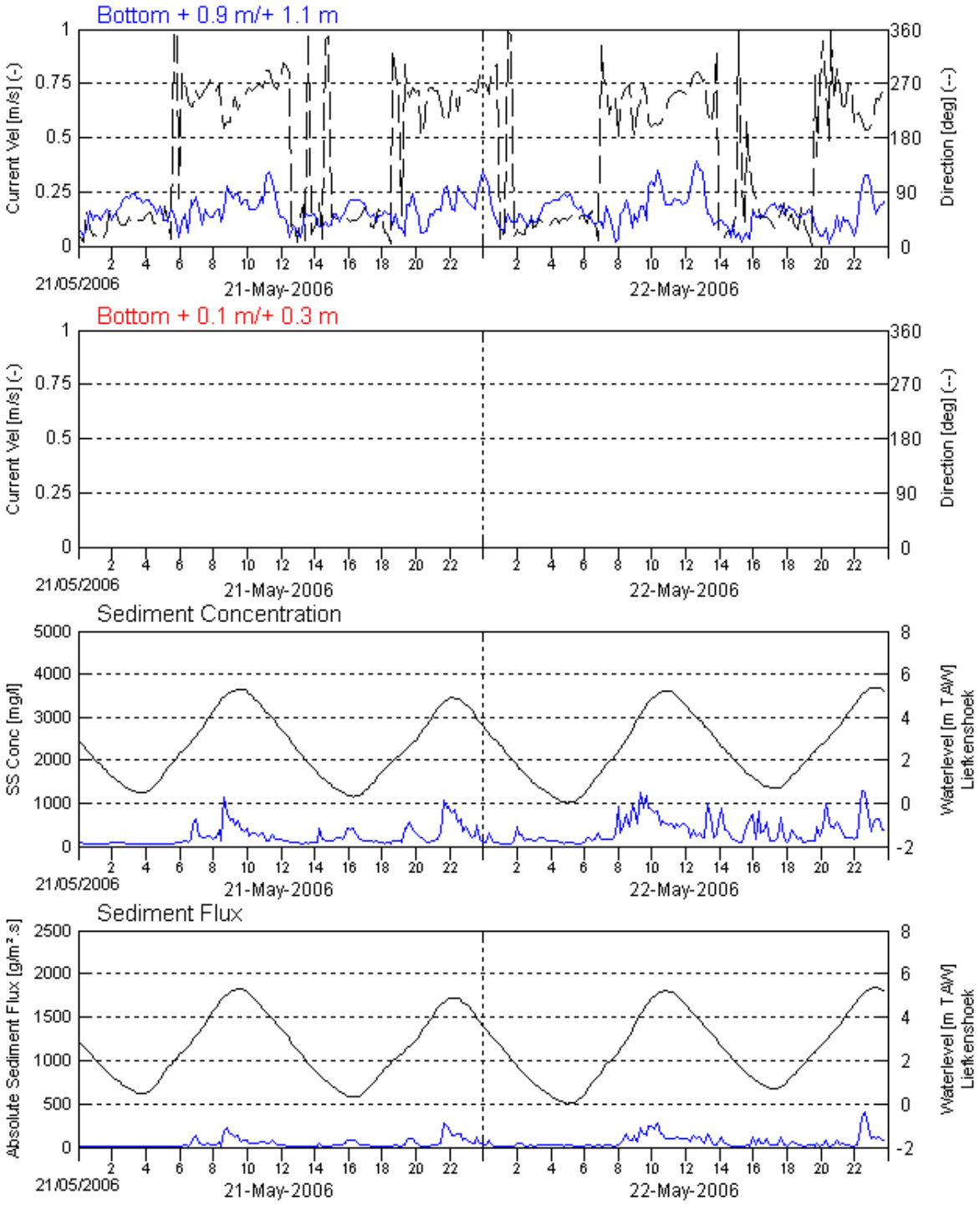
Date: 19/05/2006– 20/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:
Deurganckdok Sill

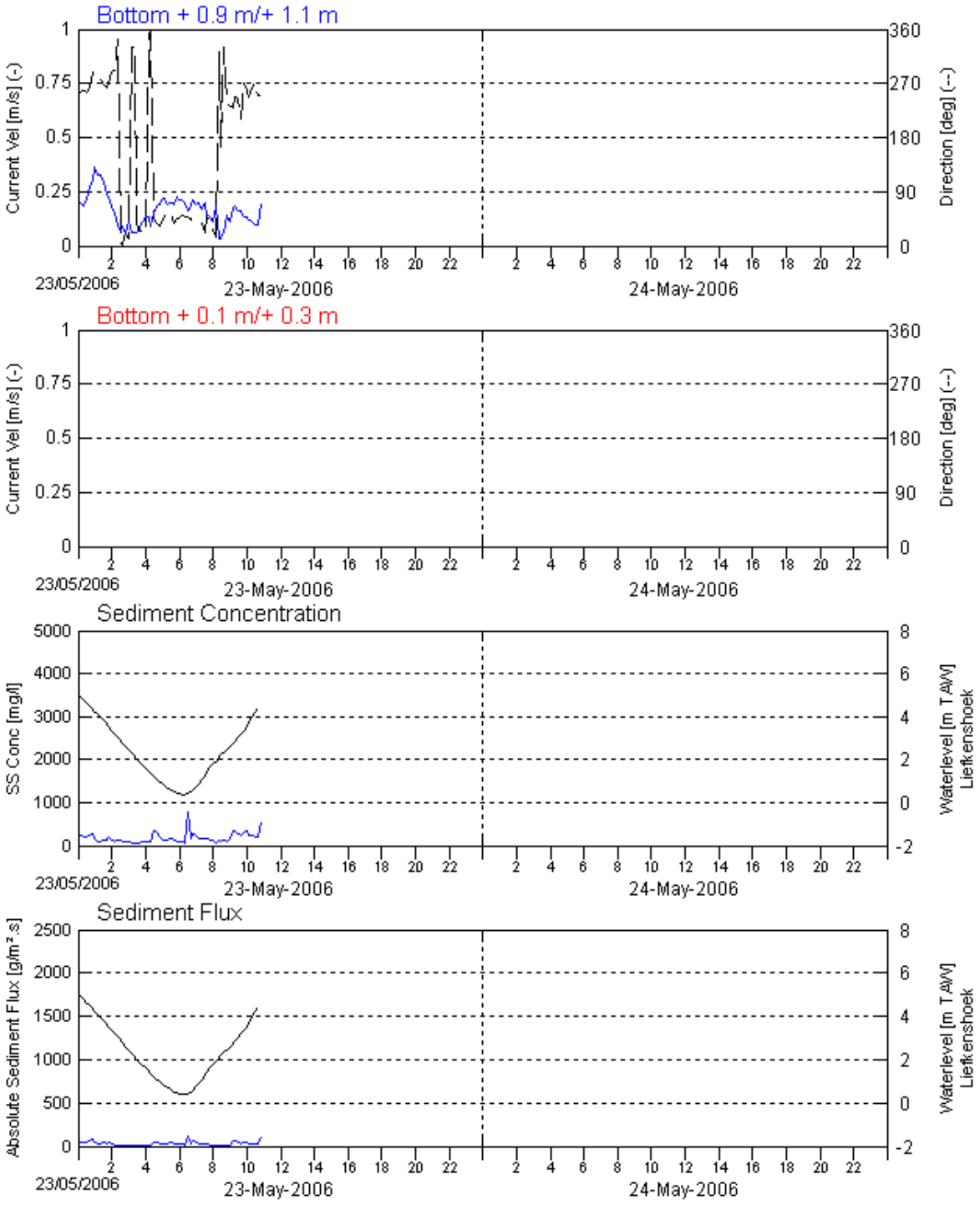
Date:
21/05/2006– 22/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006



Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location: Deurganckdok Sill

Date: 23/05/2006

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121MSA

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060419	1	flood	3.5	0.2	238.8	-	-	221.8	-	53.2	-
20060420	1	ebb	4.9	0.2	143.6	-	-	150.4	-	35.2	-
20060420	2	flood	5	0.2	180.1	-	-	265.9	-	67.6	-
20060420	2	ebb	4.9	0.2	157.8	-	-	112.1	-	23.4	-
20060420	3	flood	4.4	0.2	176.5	-	-	162.8	-	36.2	-
20060421	3	ebb	4.6	0.2	128.1	-	-	98.6	-	20.7	-
20060421	4	flood	4.6	0.2	176.7	-	-	227.4	-	45.1	-
20060421	4	ebb	4.3	0.2	142.7	-	-	106.3	-	21.9	-
20060421	5	flood	4	0.2	164.7	-	-	131.6	-	28.8	-
20060422	5	ebb	4.2	0.2	122.9	-	-	89	-	17.1	-
20060422	6	flood	4.3	0.2	160.3	-	-	189.5	-	39.4	-
20060422	6	ebb	4.2	0.2	116	-	-	131.8	-	30	-
20060422	7	flood	3.8	0.2	157.4	-	-	148.2	-	27.4	-
20060423	7	ebb	4	0.2	120.8	-	-	69.8	-	13.5	-
20060423	8	flood	4.8	0.2	171.1	-	-	184.6	-	36.6	-
20060423	8	ebb	4.4	0.2	135.6	-	-	80.9	-	17.4	-
20060423	9	flood	4.2	0.2	167.6	-	-	137.7	-	24.9	-
20060424	9	ebb	4.8	0.2	119.2	-	-	74.7	-	15.8	-
20060424	10	flood	5	0.2	193	-	-	246.5	-	42.8	-
20060424	10	ebb	4.9	0.2	140.9	-	-	124	-	24.5	-
20060425	11	flood	4.8	0.2	169.1	-	-	181.8	-	42	-
20060425	11	ebb	5.3	0.2	129.8	-	-	92.6	-	21	-
20060425	12	flood	5.8	0.2	174.4	-	-	192.7	-	48.9	-
20060425	12	ebb	5.3	0.2	149.4	-	-	101.7	-	23	-

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060426	13	flood	5.3	0.2	177.4	-	-	257.7	-	57.7	-
20060426	13	ebb	5.5	0.2	138.2	-	-	116.2	-	26.5	-
20060427	14	flood	5.8	0.2	149.6	-	-	155.5	-	40.1	-
20060427	14	ebb	6.1	0.2	140.8	-	-	129.7	-	35.2	-
20060427	15	flood	6.2	0.2	188.6	-	-	275.2	-	90.2	-
20060427	15	ebb	5.9	0.2	139.4	-	-	161.3	-	43.7	-
20060428	16	flood	5.8	0.2	188	-	-	218.5	-	63.5	-
20060428	16	ebb	6.1	0.2	144	-	-	155.8	-	42.1	-
20060428	17	flood	6.4	0.2	186.6	-	-	290	-	93.6	-
20060428	17	ebb	6	0.2	161.7	-	-	292.9	-	62.3	-
20060429	18	flood	5.9	0.2	177.9	-	-	330.5	-	100.1	-
20060429	18	ebb	6.2	0.2	159.1	-	-	160.7	-	43.5	-
20060429	19	flood	6.1	0.2	190	-	-	263	-	87.8	-
20060429	19	ebb	6	0.2	178.6	-	-	134.3	-	35.5	-
20060430	20	flood	5.9	0.2	184.3	-	-	193	-	62.6	-
20060430	20	ebb	6.1	0.2	168.4	-	-	124.5	-	30.9	-
20060430	21	flood	5.9	0.2	176.1	-	-	135.8	-	48	-
20060501	21	ebb	5.9	0.2	184.5	-	-	125.2	-	27.6	-
20060501	22	flood	5.8	0.2	185.7	-	-	173.2	-	51.7	-
20060501	22	ebb	5.8	0.2	155.7	-	-	125.5	-	31.6	-
20060501	23	flood	5.6	0.2	179.5	-	-	226.4	-	66.5	-
20060502	23	ebb	5.4	0.2	134.4	-	-	148.7	-	40	-
20060502	24	flood	5.6	0.2	178.2	-	-	168.9	-	45.7	-
20060502	24	ebb	5.3	0.2	144.8	-	-	156.2	-	38.2	-
20060502	25	flood	5	0.2	190.2	-	-	253.9	-	63.3	-

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060503	25	ebb	5.4	0.2	147.5	-	-	182.3	-	36.2	-
20060503	26	flood	5.2	0.2	165.5	-	-	420.4	-	95.3	-
20060503	26	ebb	4.8	0.2	145.8	-	-	188.3	-	37.9	-
20060503	27	flood	4.8	0.2	177.1	-	-	287.3	-	62.7	-
20060504	27	ebb	4.9	0.2	147.6	-	-	182.8	-	32.2	-
20060504	28	flood	4.9	0.2	181.2	-	-	304.5	-	68	-
20060504	28	ebb	4.4	0.2	162.5	-	-	206.4	-	41.8	-
20060504	29	flood	4.1	0.2	172	-	-	276.7	-	53.5	-
20060505	29	ebb	4.4	0.1	124.5	-	-	210.4	-	32.9	-
20060505	30	flood	4.4	0.2	180.8	-	-	418.6	-	92.5	-
20060505	30	ebb	4	0.2	150.3	-	-	330.9	-	58.7	-
20060505	31	flood	3.7	0.2	160.9	-	-	329.7	-	54.6	-
20060506	31	ebb	3.8	0.2	124.3	-	-	166.4	-	28.1	-
20060506	32	flood	4.1	0.2	182.7	-	-	308.7	-	61.8	-
20060506	32	ebb	3.9	0.2	140.8	-	-	105.9	-	21.4	-
20060506	33	flood	3.5	0.2	160.1	-	-	134.7	-	24.8	-
20060507	33	ebb	3.8	0.1	145.8	-	-	87.2	-	14.8	-
20060507	34	flood	4.1	0.2	172.6	-	-	195.6	-	40.6	-
20060507	34	ebb	3.9	0.2	150.5	-	-	89.6	-	18.4	-
20060507	35	flood	3.7	0.2	148.9	-	-	128.9	-	25.7	-
20060508	35	ebb	4.2	0.2	133.6	-	-	82.6	-	16.5	-
20060508	36	flood	4.5	0.2	171	-	-	189.4	-	38	-
20060508	36	ebb	4.3	0.2	133.4	-	-	112.5	-	25	-
20060509	37	flood	4.3	0.2	190.7	-	-	165.4	-	37.9	-
20060509	37	ebb	4.4	0.2	108.4	-	-	101	-	23.5	-

RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060509	38	flood	4.8	0.2	175.2	-	-	209	-	50	-
20060509	38	ebb	4.6	0.2	128.2	-	-	98.6	-	22.8	-
20060510	39	flood	4.5	0.2	159.9	-	-	199.1	-	43.7	-
20060510	39	ebb	5	0.2	117.7	-	-	91.6	-	21	-
20060511	40	flood	5.1	0.2	157.8	-	-	165.9	-	33.7	-
20060511	40	ebb	5.2	0.2	147.3	-	-	133.9	-	29	-
20060511	41	flood	5.3	0.2	190.1	-	-	289.9	-	61.4	-
20060511	41	ebb	5.3	0.2	170.8	-	-	182.5	-	44.2	-
20060512	42	flood	5.2	0.2	165	-	-	244.3	-	55	-
20060512	42	ebb	5.4	0.2	131.6	-	-	163.1	-	37	-
20060512	43	flood	5.5	0.2	163.5	-	-	425.1	-	84.7	-
20060512	43	ebb	5.5	0.2	134.6	-	-	168.6	-	37.3	-
20060513	44	flood	5.5	0.2	183.6	-	-	368.9	-	79	-
20060513	44	ebb	5.5	0.2	160.9	-	-	161	-	32.8	-
20060513	45	flood	5.7	0.2	172.5	-	-	313.6	-	65.9	-
20060513	45	ebb	5.5	0.2	145.6	-	-	161.3	-	37.3	-
20060514	46	flood	5.4	0.2	180.1	-	-	256	-	61.9	-
20060514	46	ebb	5.6	0.2	150.9	-	-	209.1	-	47.1	-
20060514	47	flood	5.6	0.2	180.6	-	-	230	-	52.2	-
20060514	47	ebb	5.7	0.2	141.2	-	-	151.8	-	30.4	-
20060515	48	flood	5.5	0.2	180.4	-	-	216.6	-	45	-
20060515	48	ebb	5.6	0.2	179.2	-	-	187.4	-	35.6	-
20060515	49	flood	5.6	0.2	171.7	-	-	222.2	-	44.3	-
20060515	49	ebb	5.5	0.2	154.9	-	-	294.6	-	62.4	-
20060516	50	flood	5.6	0.2	169.7	-	-	242.8	-	53.2	-

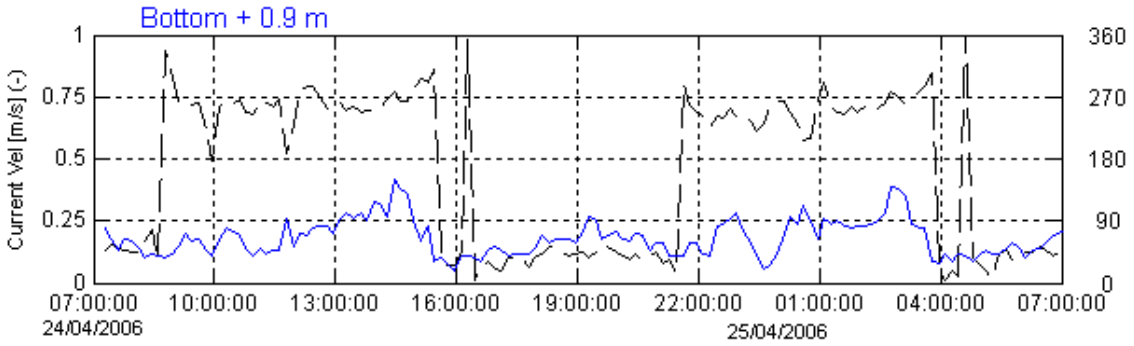
RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

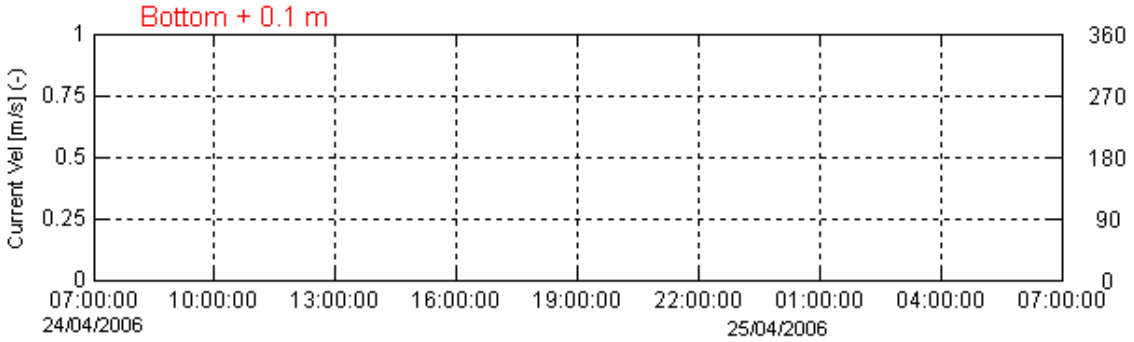
Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060516	50	ebb	5.5	0.2	142.5	-	-	170.3	-	37.1	-
20060516	51	flood	5.4	0.2	154.9	-	-	278.3	-	52.4	-
20060517	51	ebb	5.5	0.2	186.2	-	-	138.6	-	29.9	-
20060517	52	flood	5.5	0.2	171.9	-	-	295.8	-	60.4	-
20060517	52	ebb	5.5	0.2	150	-	-	189.4	-	39.2	-
20060517	53	flood	5.1	0.2	176.1	-	-	245.9	-	41.6	-
20060518	53	ebb	5.4	0.2	177.9	-	-	163.8	-	32.4	-
20060518	54	flood	5.6	0.2	176.3	-	-	549.7	-	119.1	-
20060518	54	ebb	5.1	0.2	154	-	-	292.1	-	59.9	-
20060518	55	flood	4.9	0.2	169	-	-	449.5	-	75.7	-
20060519	55	ebb	5.1	0.2	154.7	-	-	215.7	-	39.3	-
20060519	56	flood	5.4	0.2	160.3	-	-	488.1	-	99.5	-
20060519	56	ebb	4.3	0.2	194.1	-	-	262.5	-	52.7	-
20060519	57	flood	4.3	0.1	164	-	-	250.3	-	35.3	-
20060520	57	ebb	5.2	0.2	188.1	-	-	204.4	-	38.3	-
20060520	58	flood	4.9	0.2	166.4	-	-	336.9	-	61.4	-
20060520	58	ebb	4.3	0.2	137.2	-	-	234.8	-	45.5	-
20060520	59	flood	4.6	0.2	184.7	-	-	401	-	75.5	-
20060521	59	ebb	4.9	0.2	138.5	-	-	188.6	-	39.9	-
20060521	60	flood	4.8	0.2	187.8	-	-	255.7	-	49.3	-
20060521	60	ebb	5	0.2	164	-	-	198.6	-	34.1	-
20060521	61	flood	4.6	0.2	166	-	-	263.9	-	49.2	-
20060522	61	ebb	4.9	0.2	139.3	-	-	209.8	-	40.5	-
20060522	62	flood	5.2	0.2	173.6	-	-	456.3	-	82	-
20060522	62	ebb	4.5	0.2	165.1	-	-	401.1	-	64.3	-

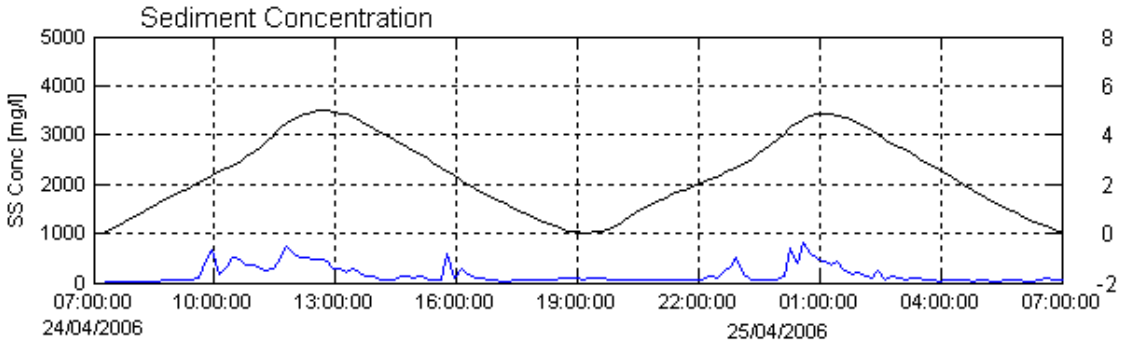
RCM9 & VALEPORT AVERAGES FOR EVERY TIDAL PHASE

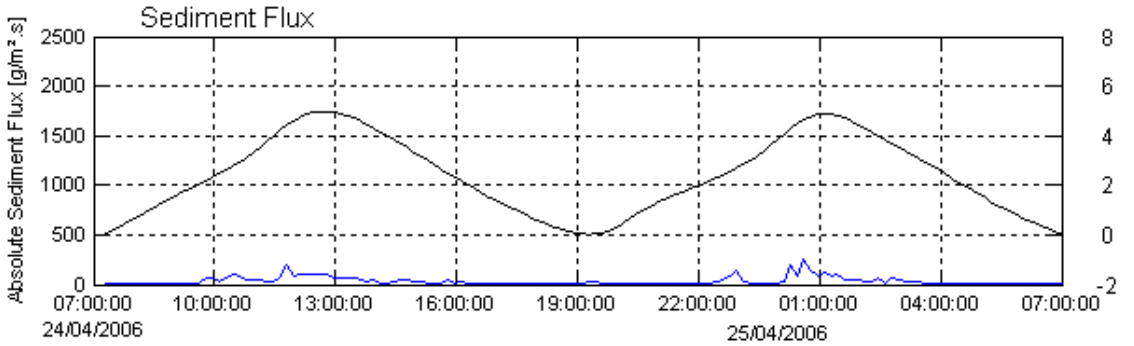
Date	Tide no.	Phase	Tidal Diff	UP Velocity (RCM9) Bottom +0.9m		DOWN Velocity (Valeport) Bottom +0.1m		SS Concentration [mg/l]		SS Flux [g/m²s]	
			[m]	Magnitude [m/s]	Direction [°]	Magnitude [m/s]	Direction [°]	UP (RCM9)	DOWN (Valeport)	UP (RCM9)	DOWN (Valeport)
20060522	63	flood	4.7	0.1	160.6	-	-	377.5	-	62.3	-
20060523	63	ebb	4.9	0.2	169.1	-	-	163.7	-	31.8	-

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006









Current Velocity and Direction upper (RCM9) and lower (Valeport) EMC, OBS SS Conc. & flux and waterlevel

Location:	Date:
Deurganckdok Sill	Avg Tide 24/04– 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

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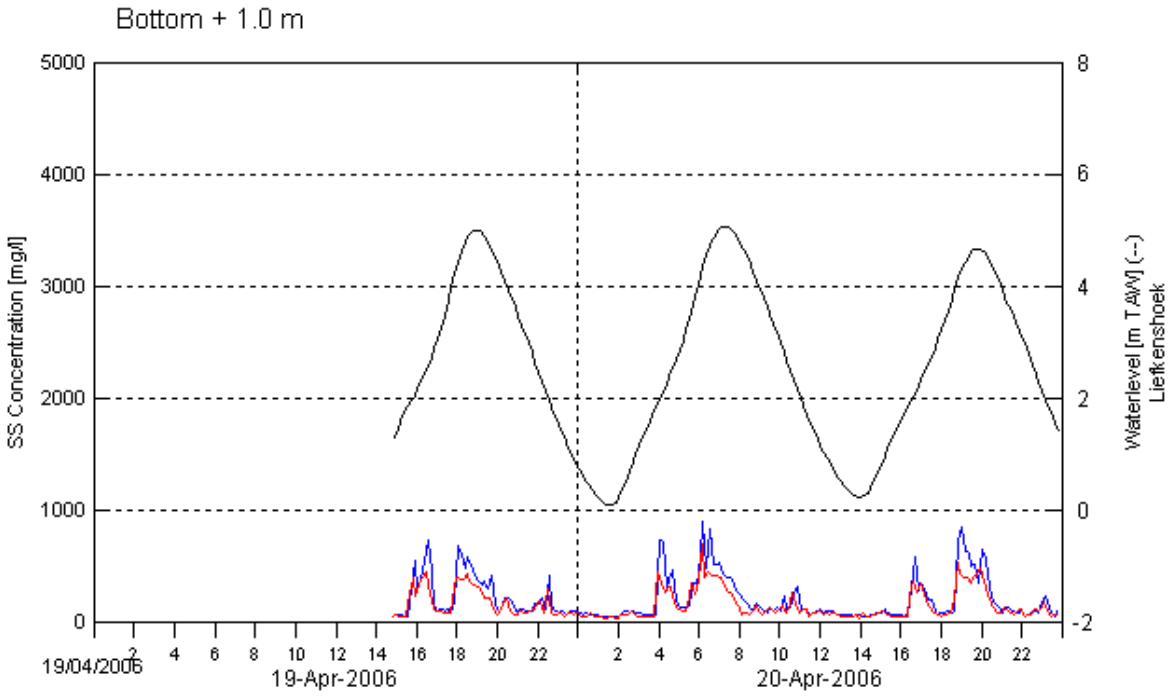
APPENDIX E.

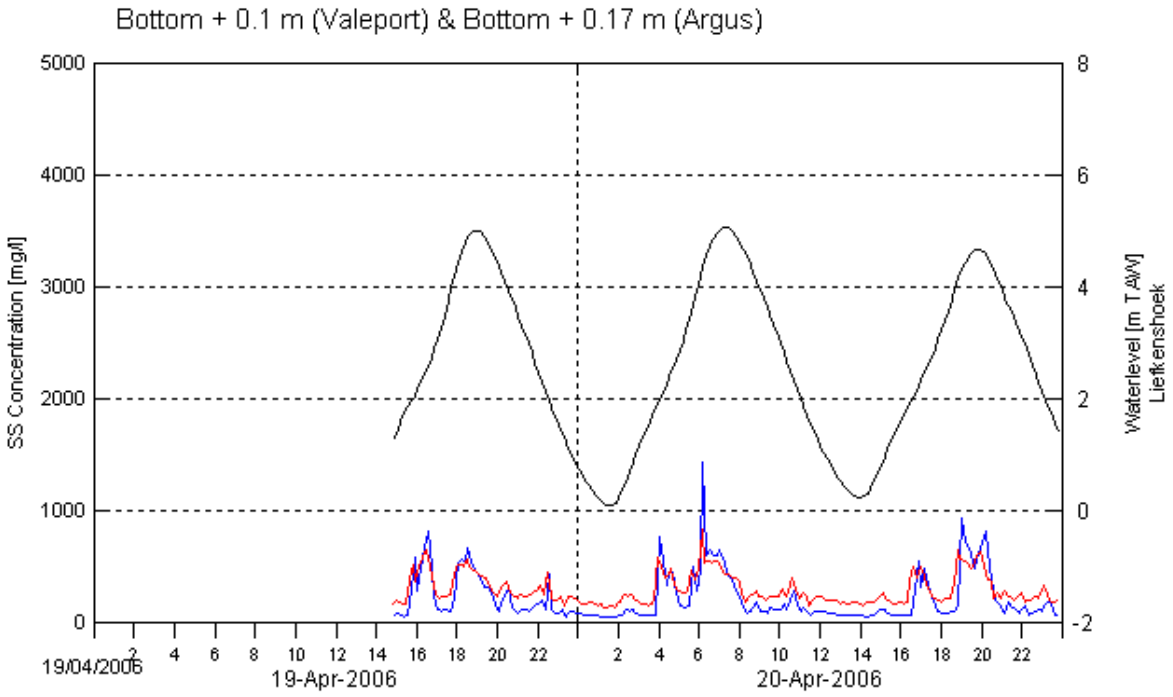
COMPARISON OF RCM9 & VALEPORT SENSORS

TO ARGUS SENSORS

E.1 CDW Frame

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

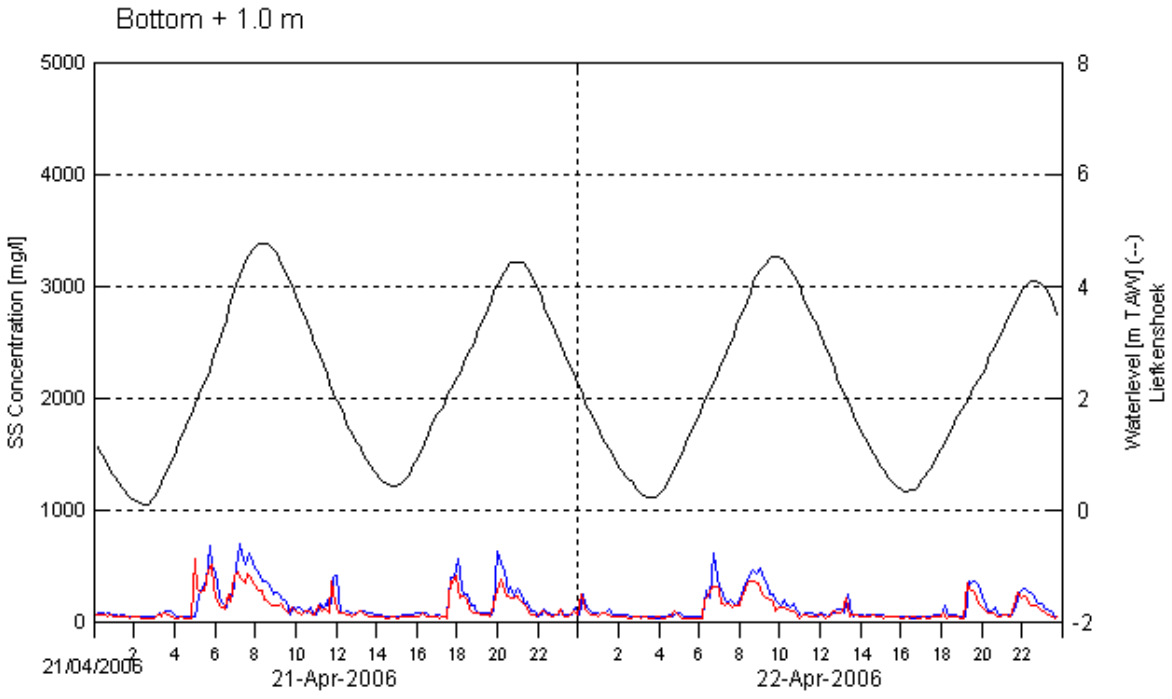
Date: 19/04/06 – 20/04/06

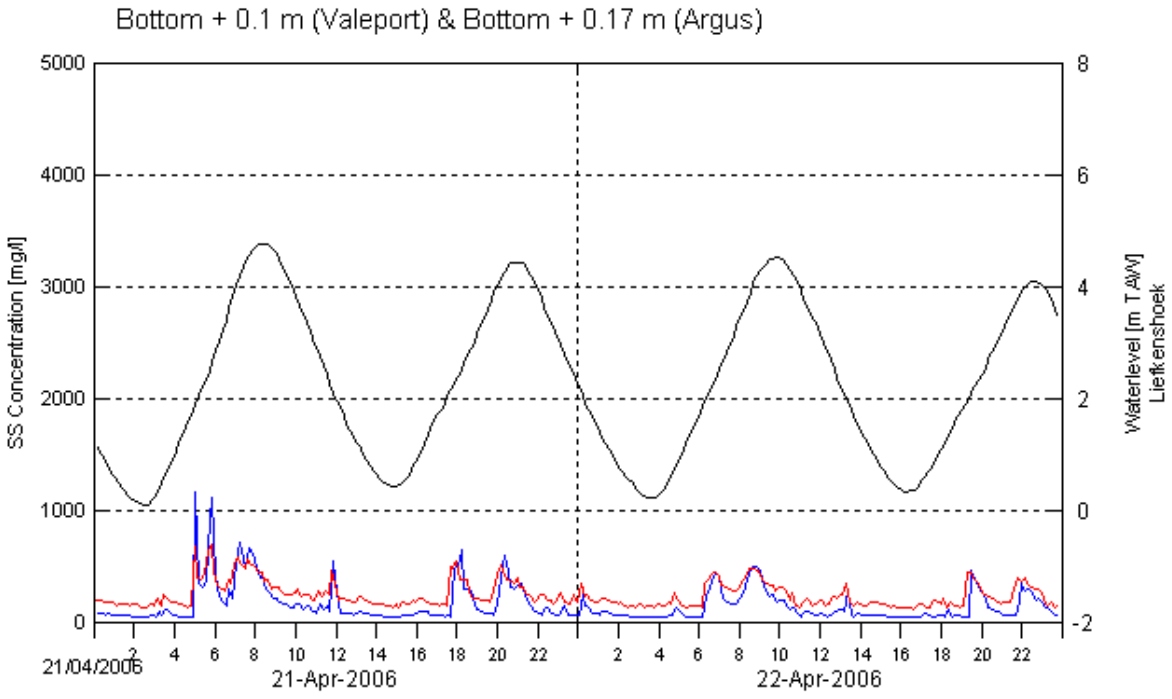
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

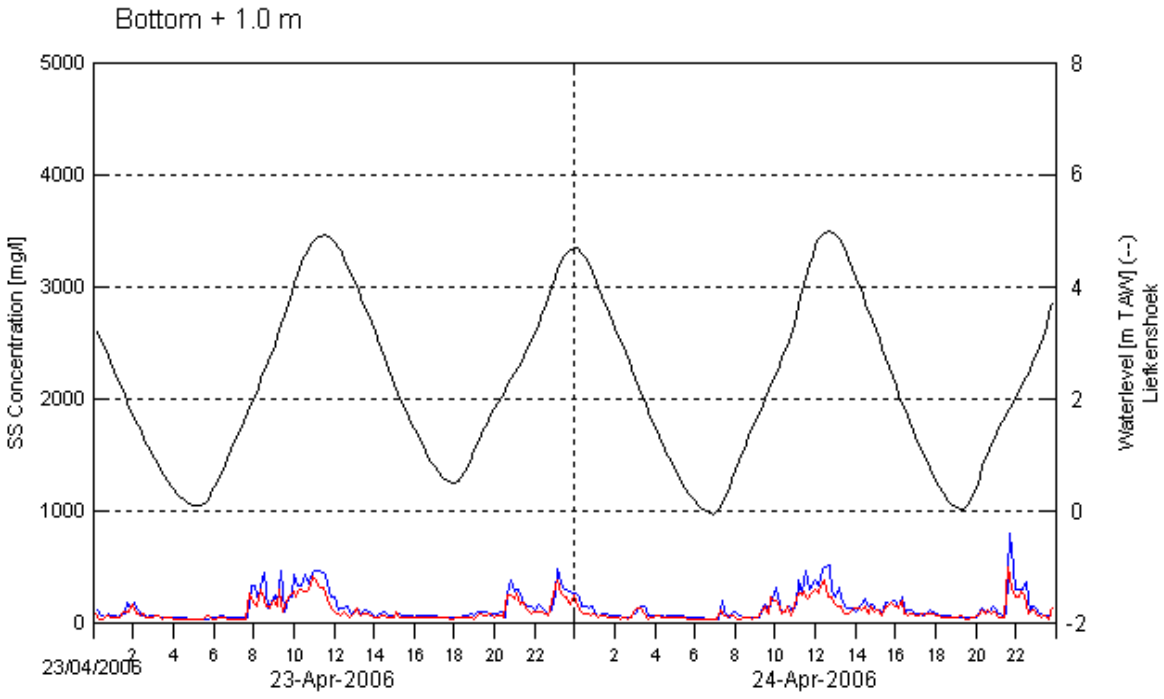
Date: 21/04/06 – 22/04/06

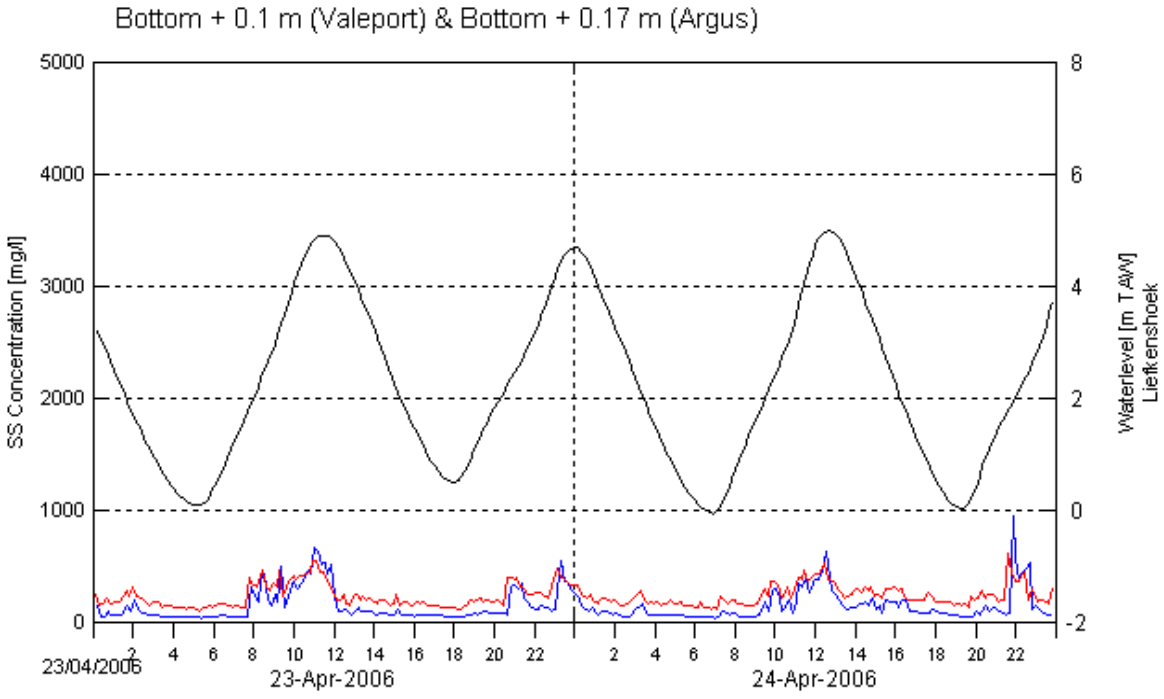
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

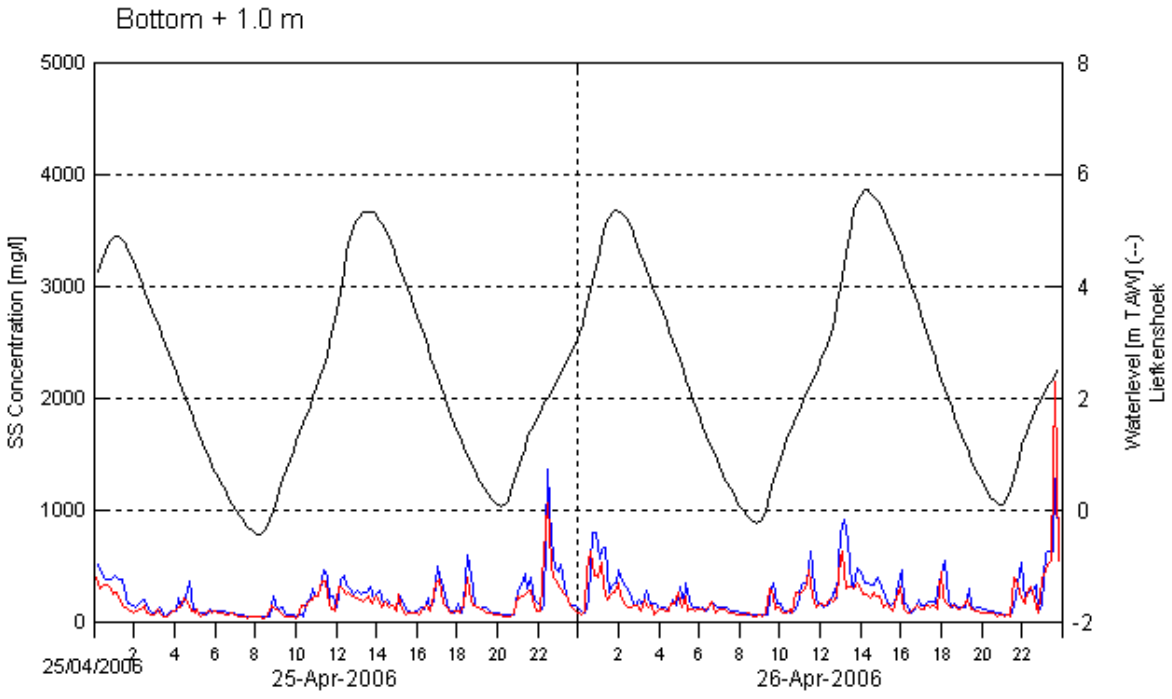
Date: 23/04/06 – 24/04/06

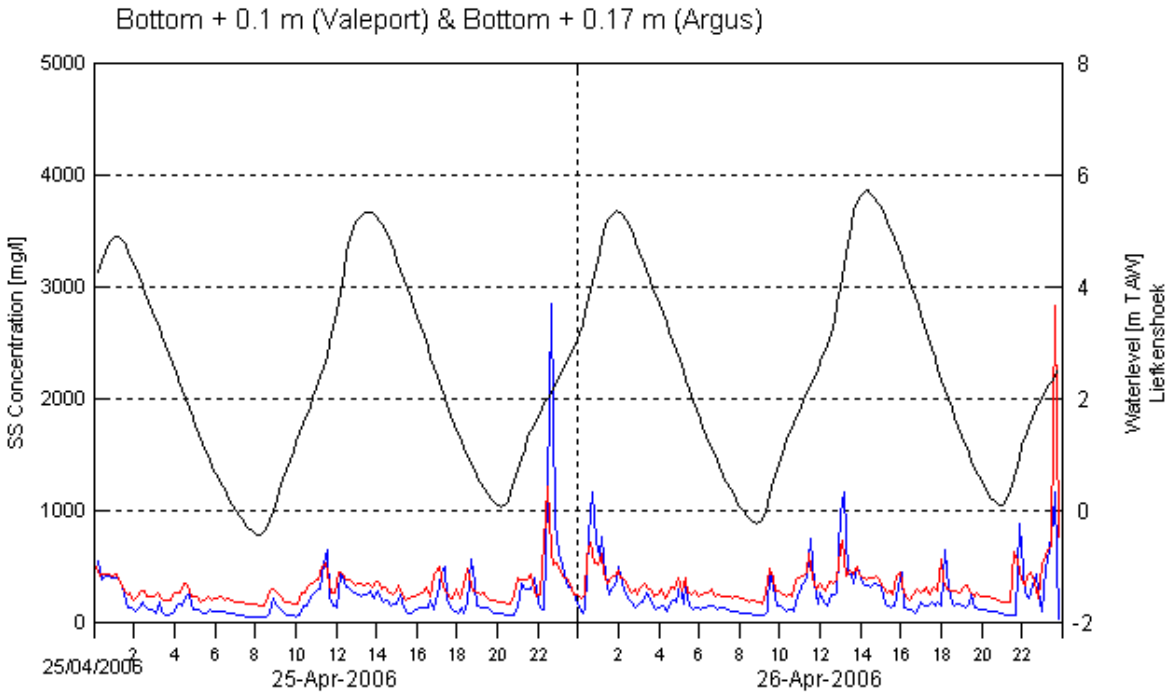
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

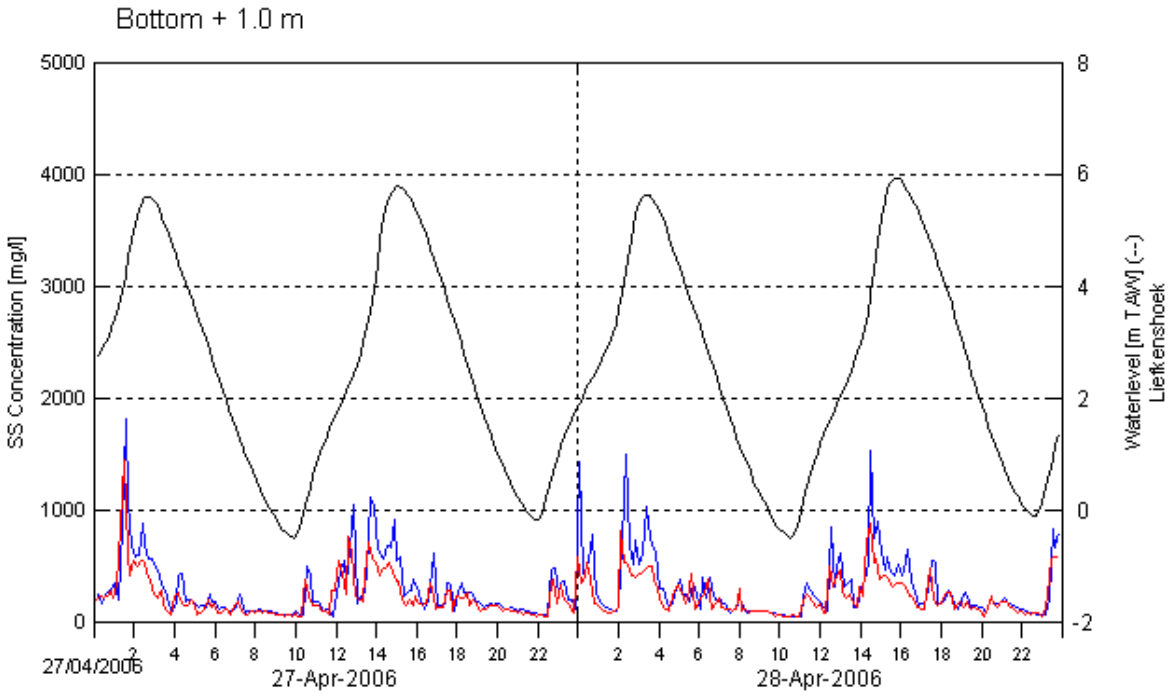
Date: 25/04/06 – 26/04/06

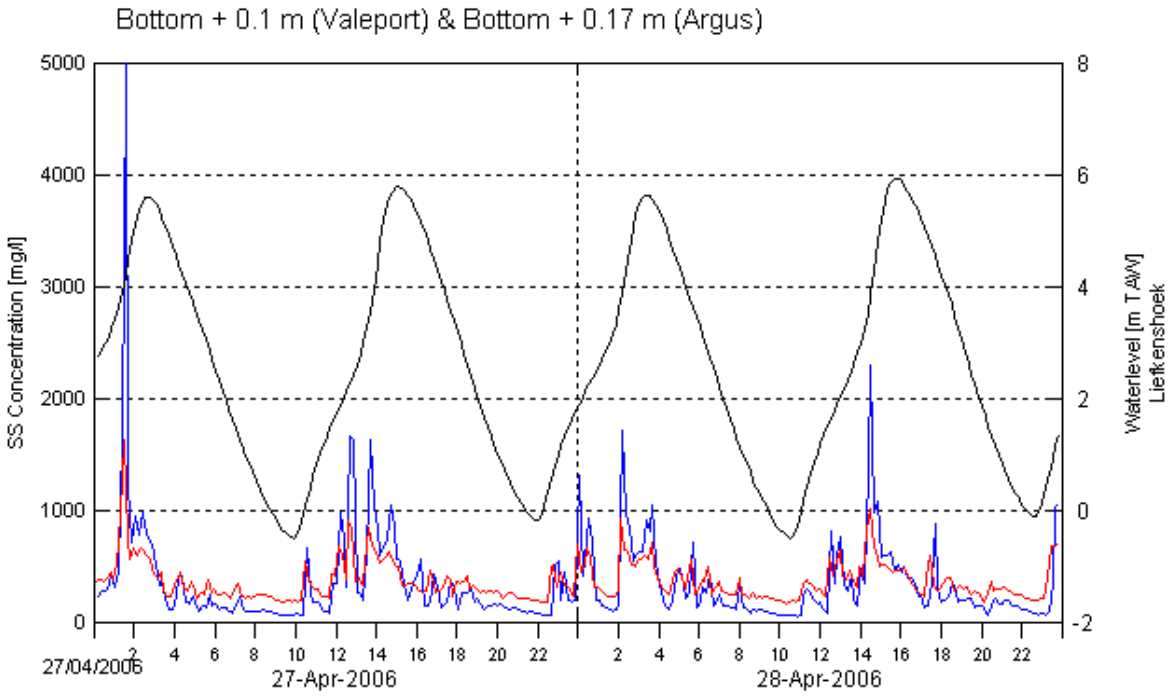
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

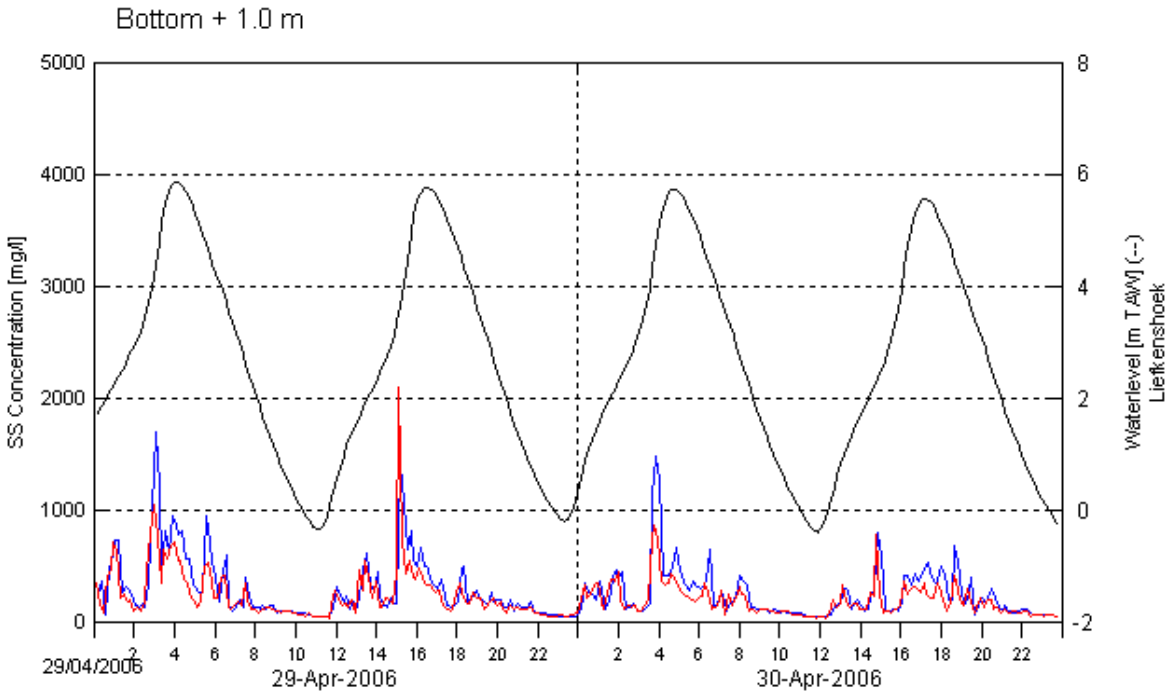
Date: 27/04/06 – 28/04/06

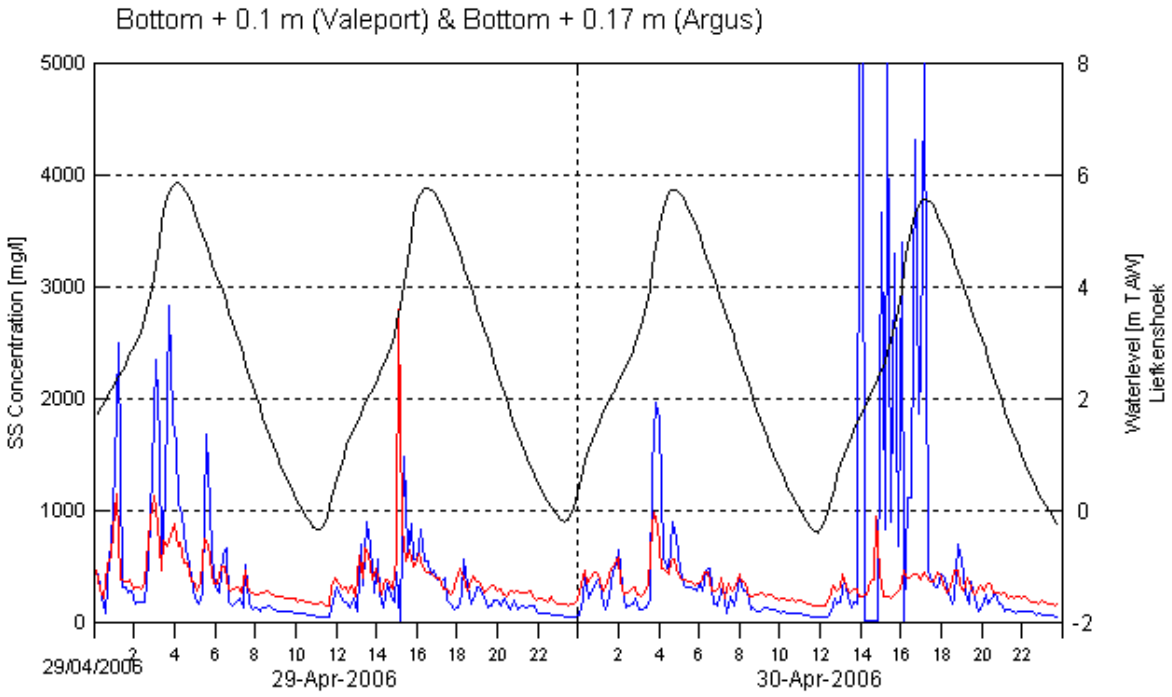
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

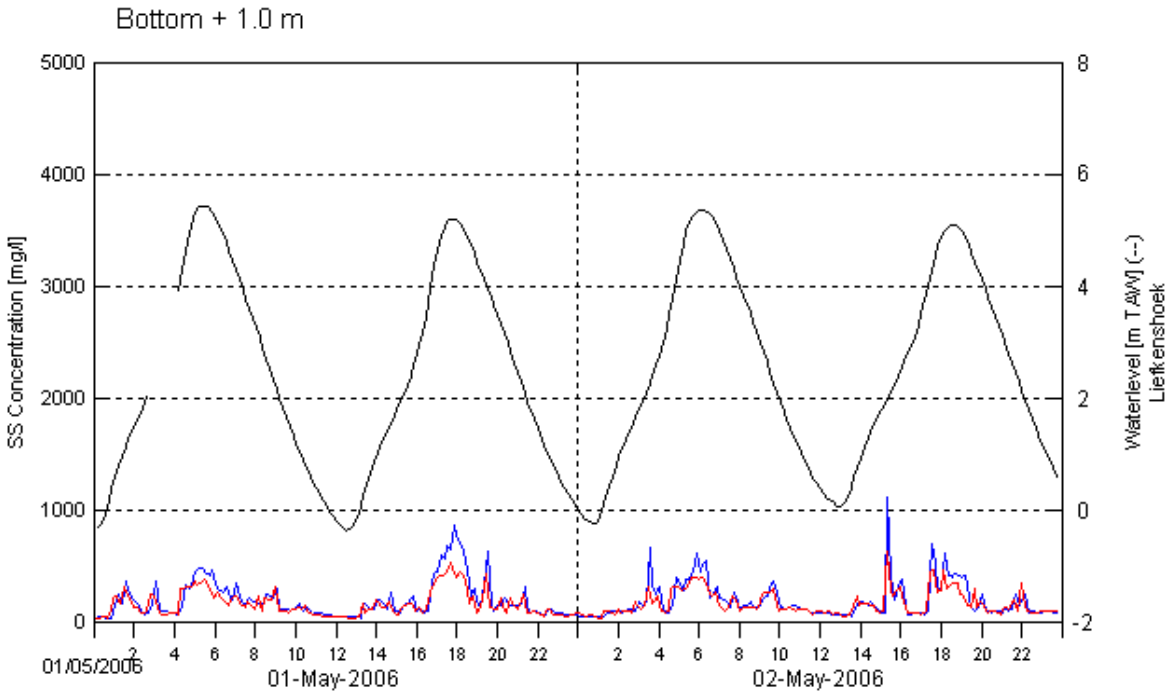
Date: 29/04/06 – 30/04/06

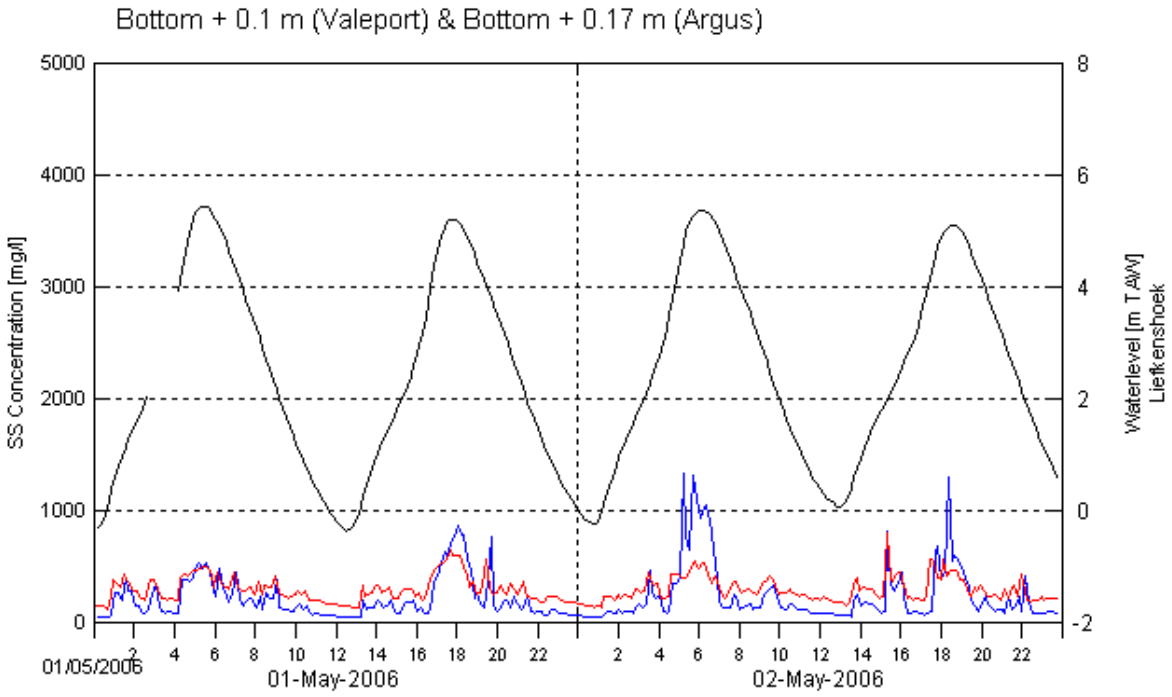
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

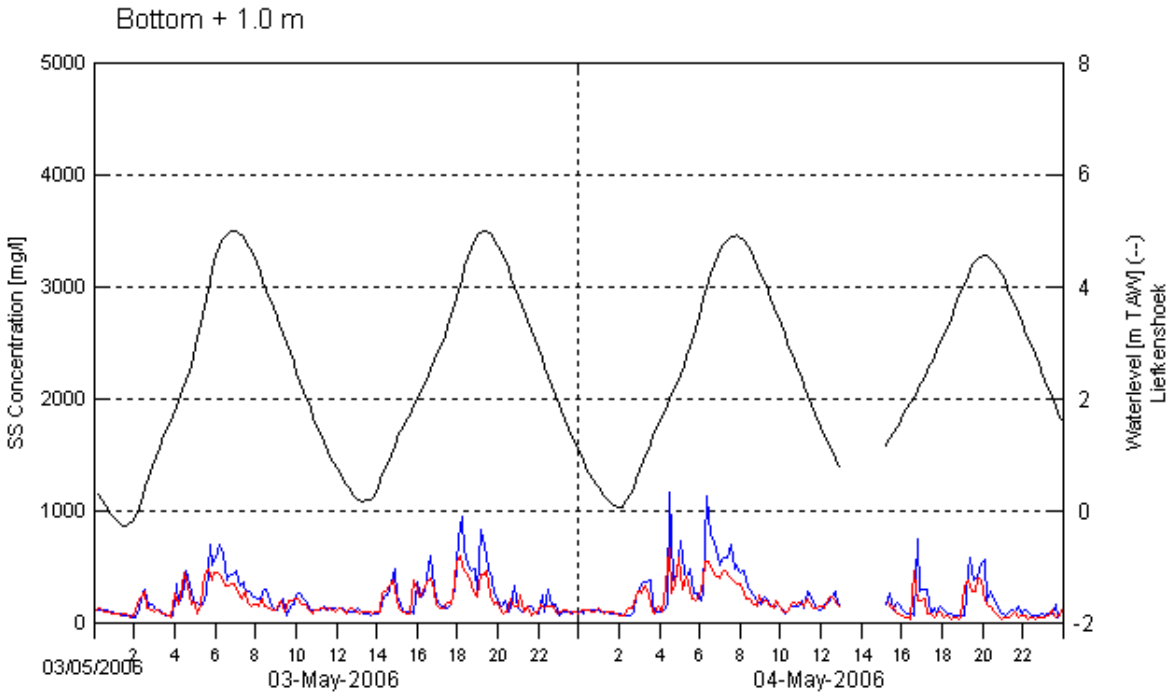
Location:	Date:
Deurganckdok CDW	01/05/06 – 02/05/06

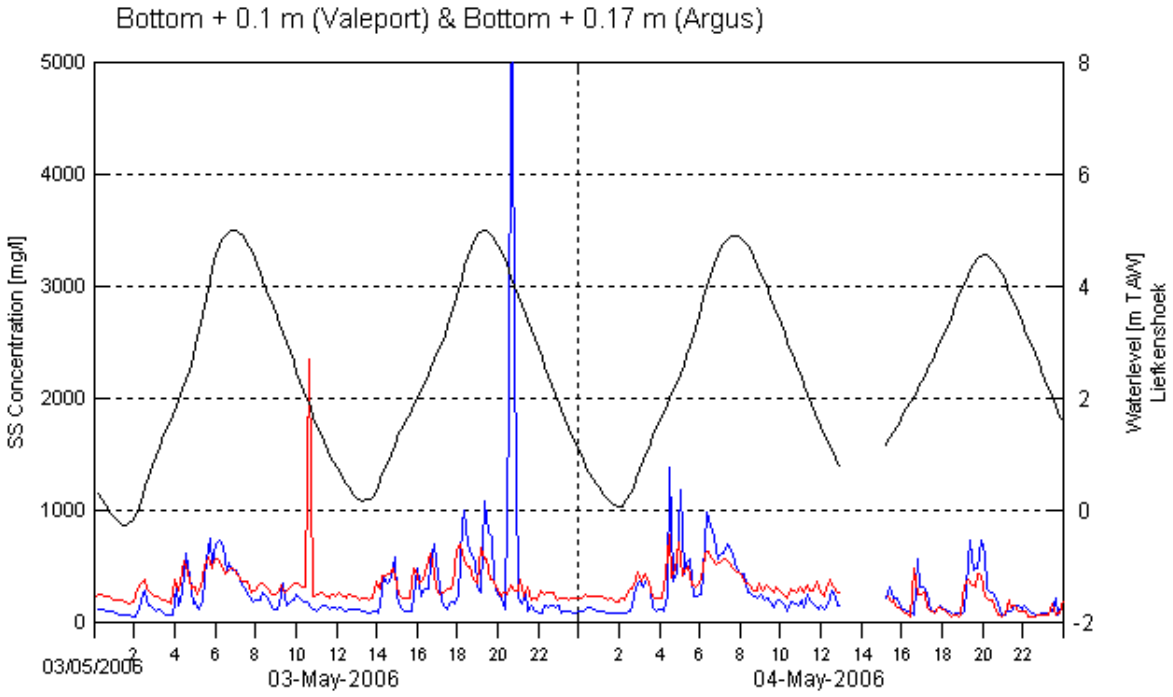
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

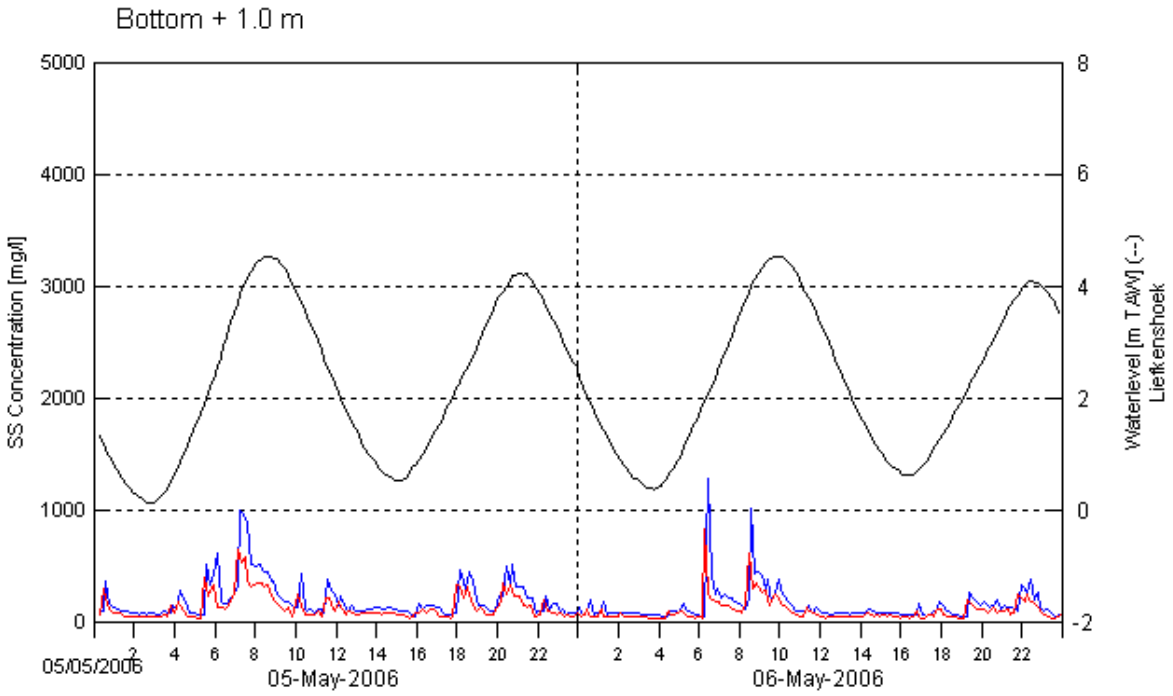
Date: 03/05/06 – 04/05/06

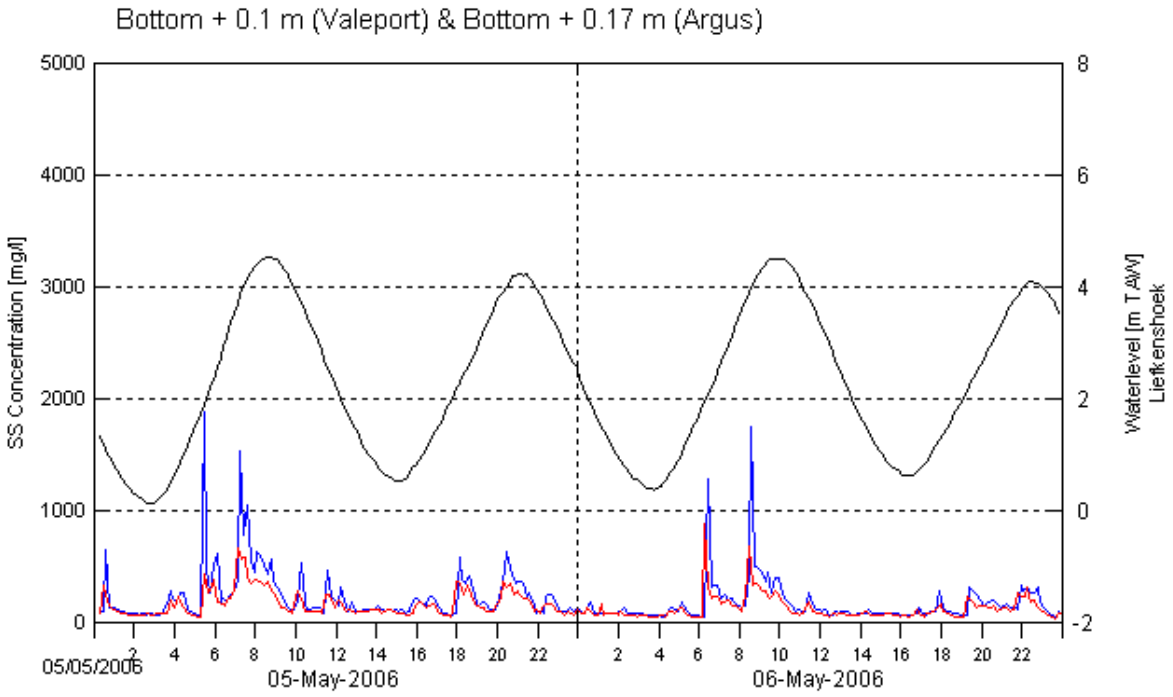
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

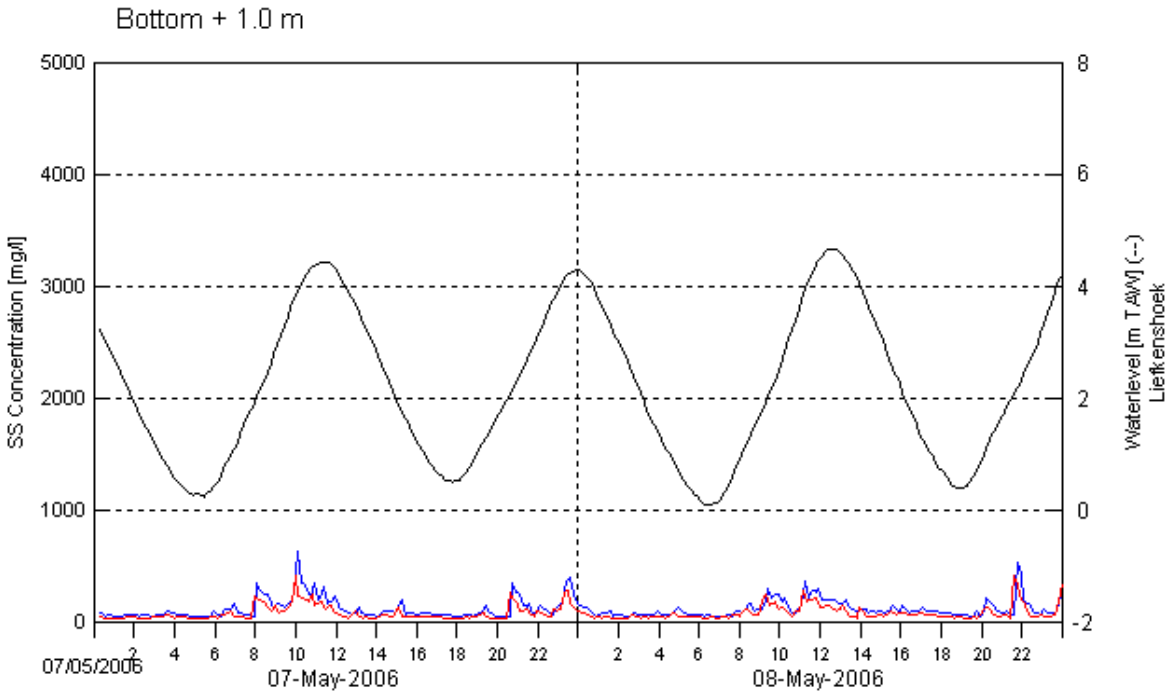
Date: 05/05/06 – 06/05/06

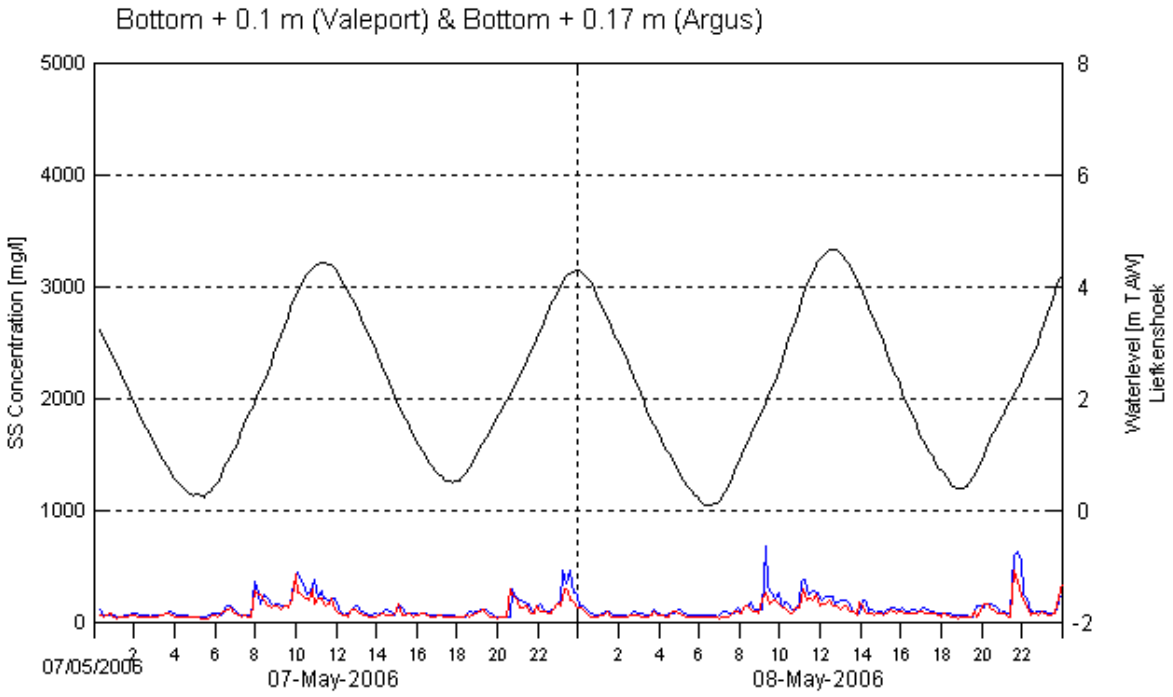
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

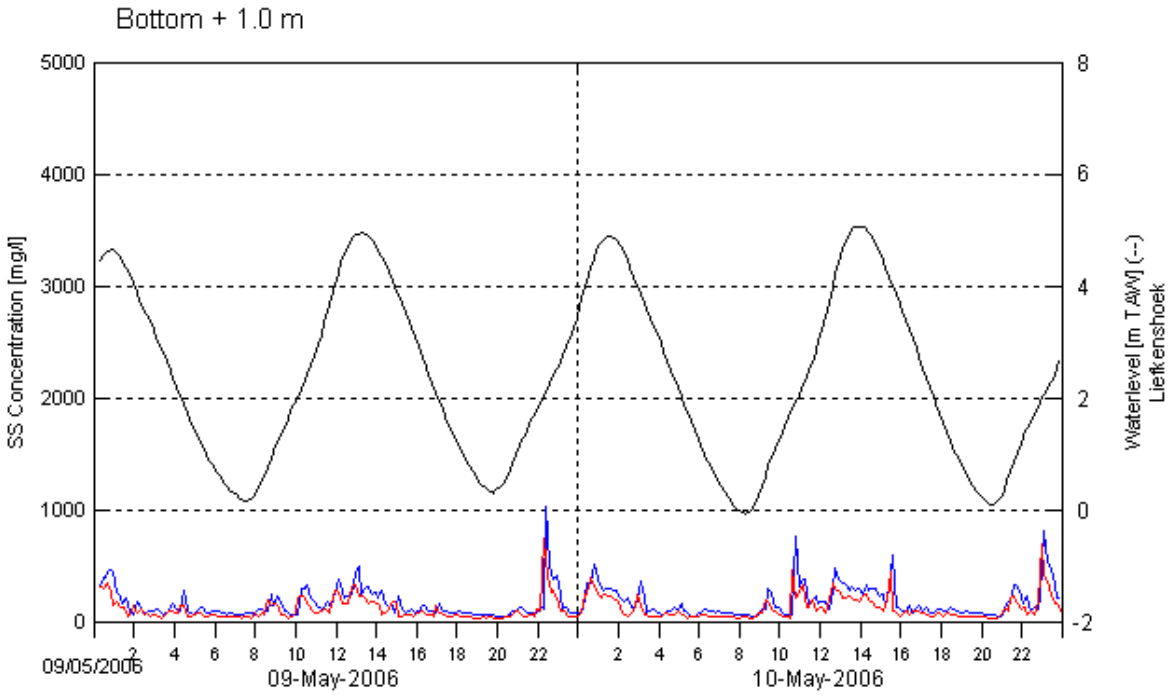
Date: 07/05/06 – 08/05/06

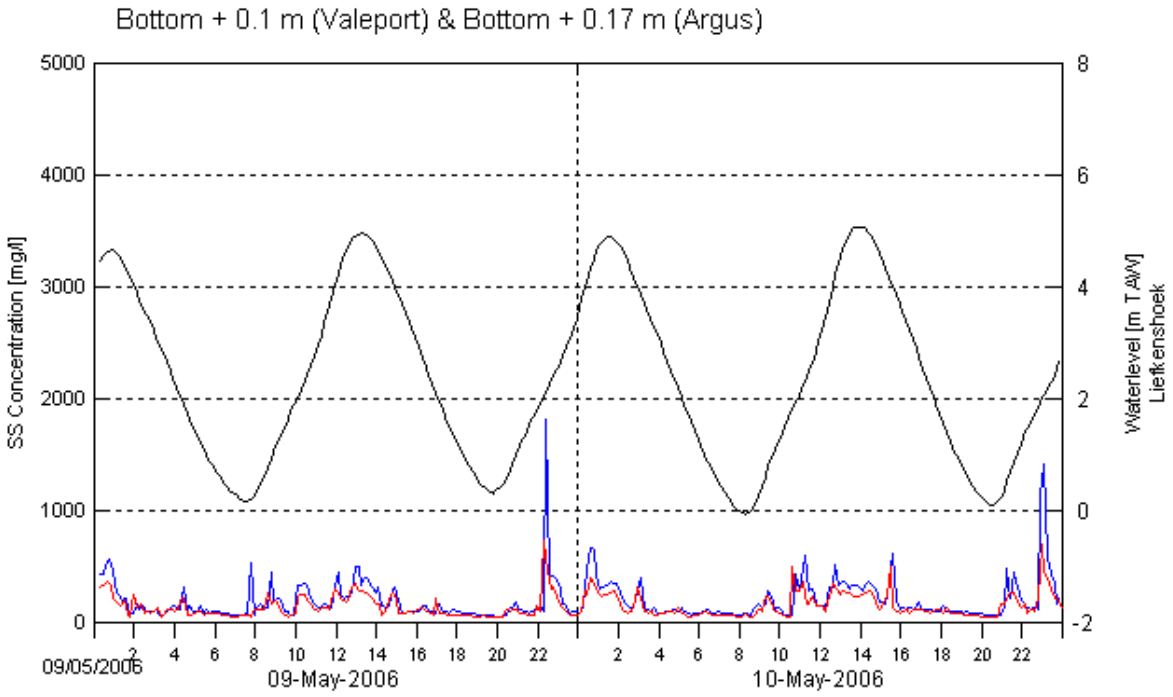
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

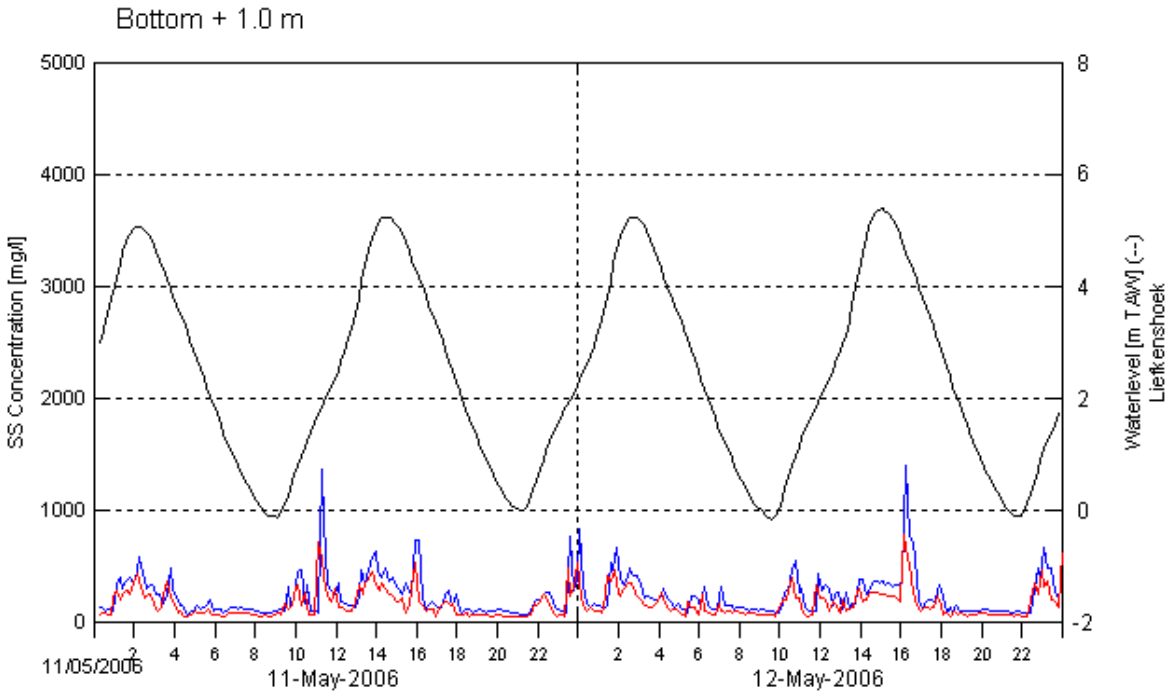
Date: 09/05/06 – 10/05/06

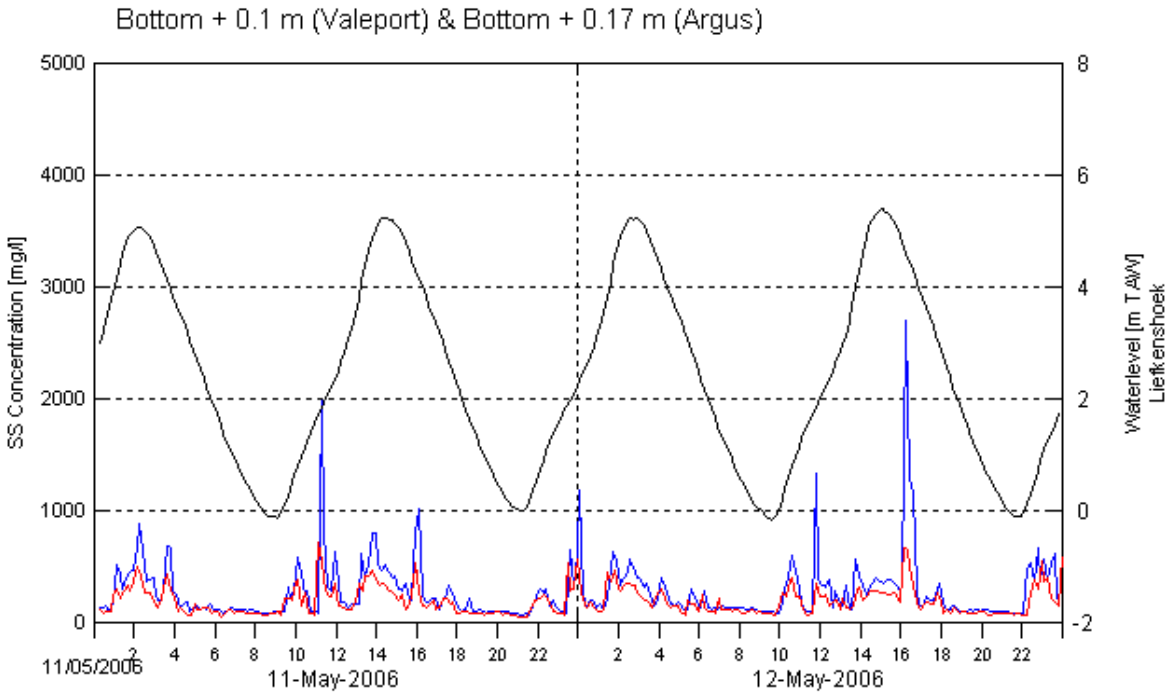
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

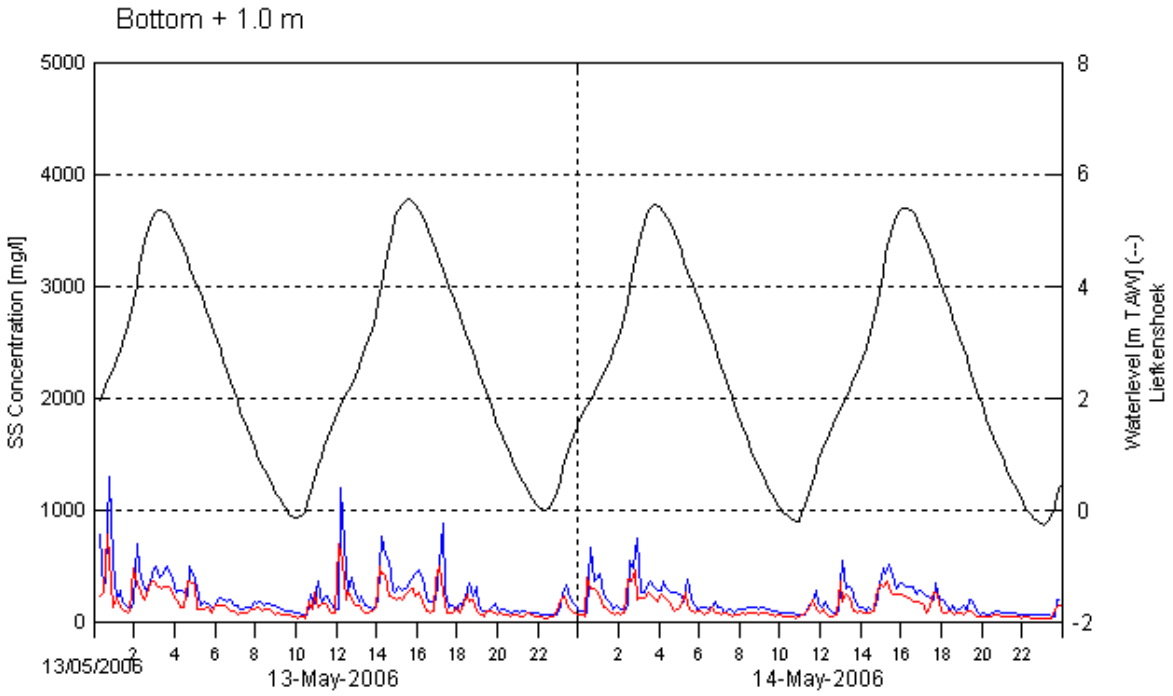
Location:	Date:
Deurganckdok CDW	11/05/06 – 12/05/06

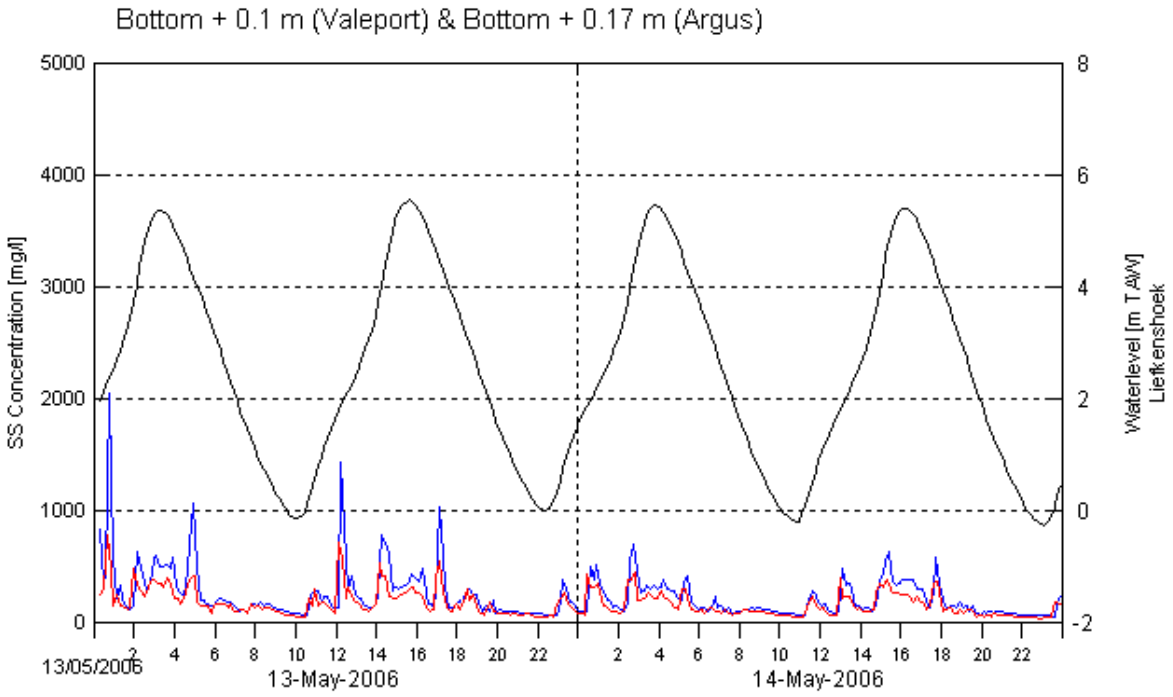
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

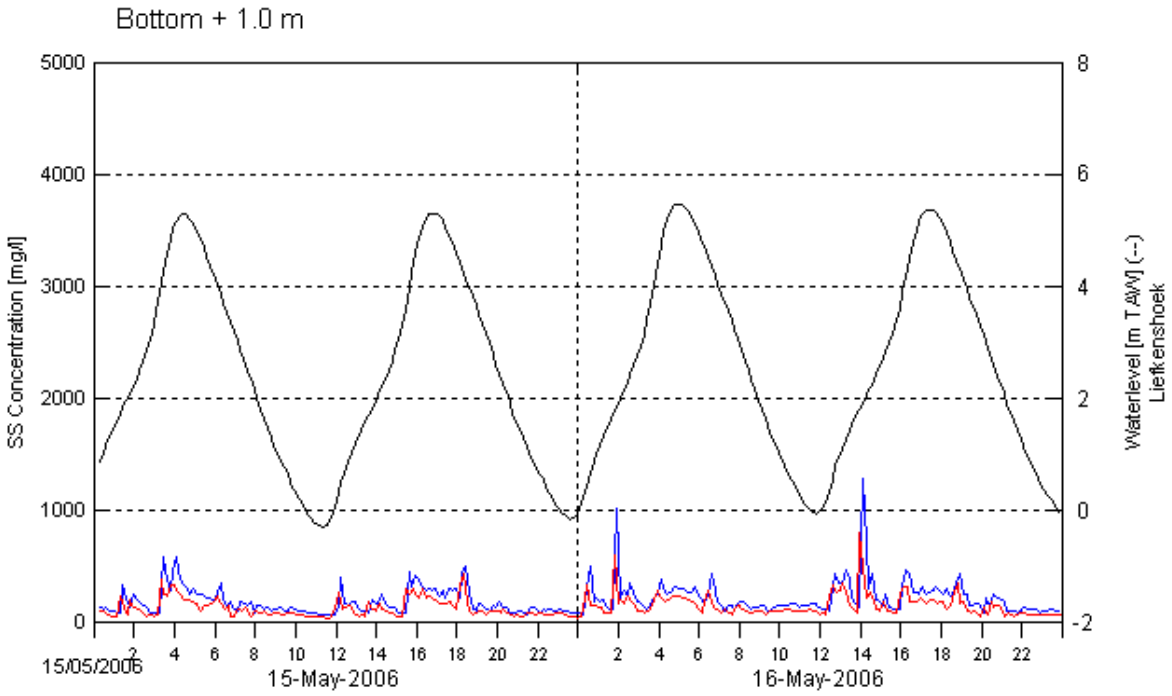
Date: 13/05/06 – 14/05/06

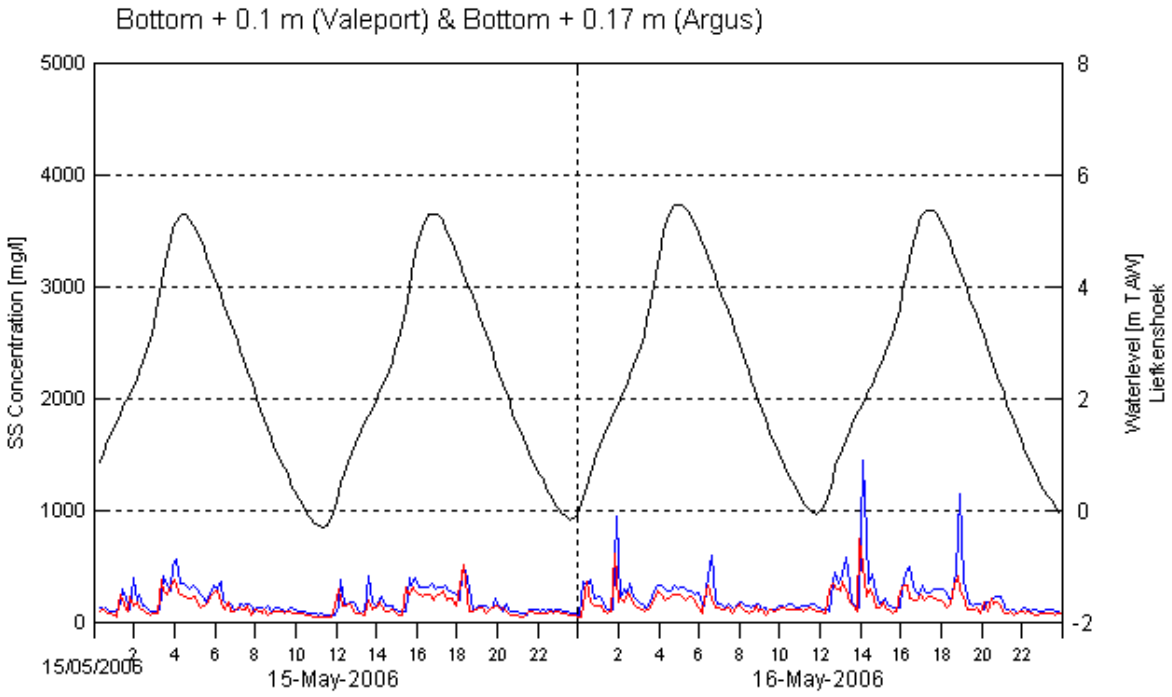
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

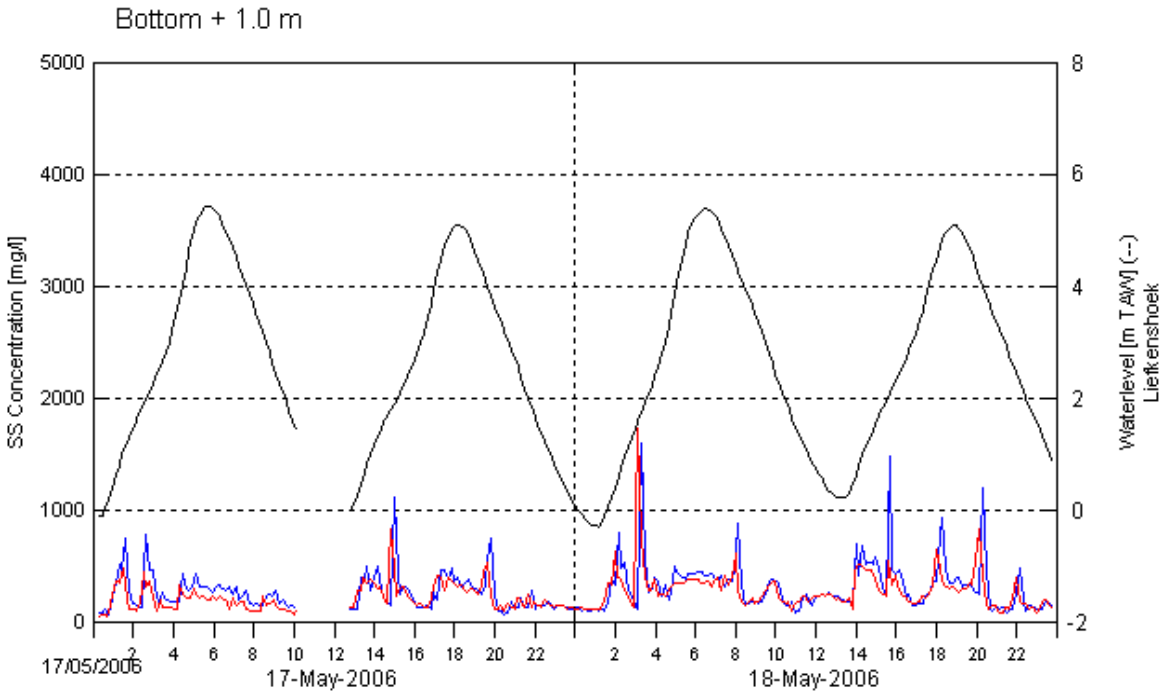
Date: 15/05/06 – 16/05/06

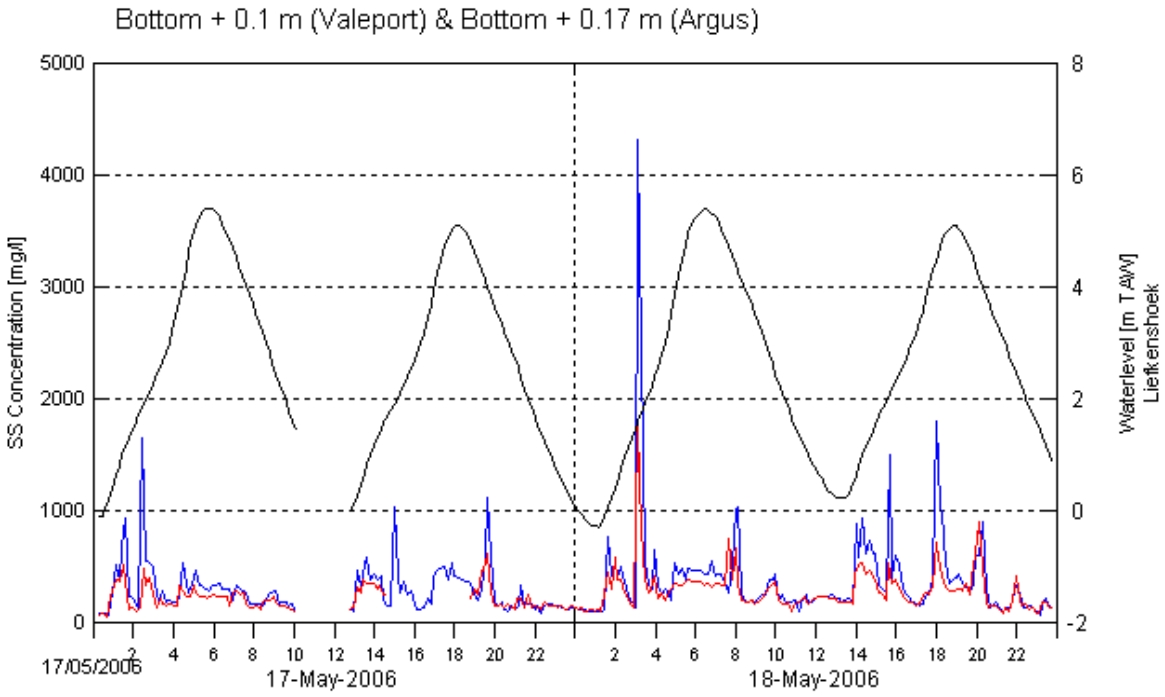
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

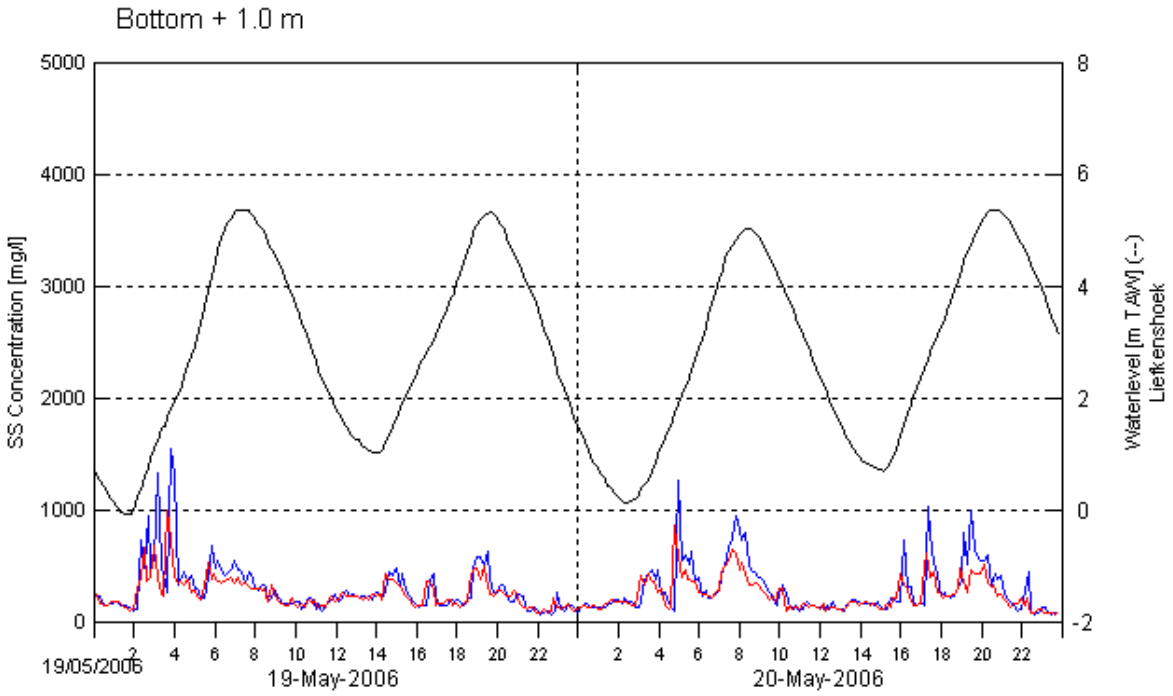
Date: 17/05/06 – 18/05/06

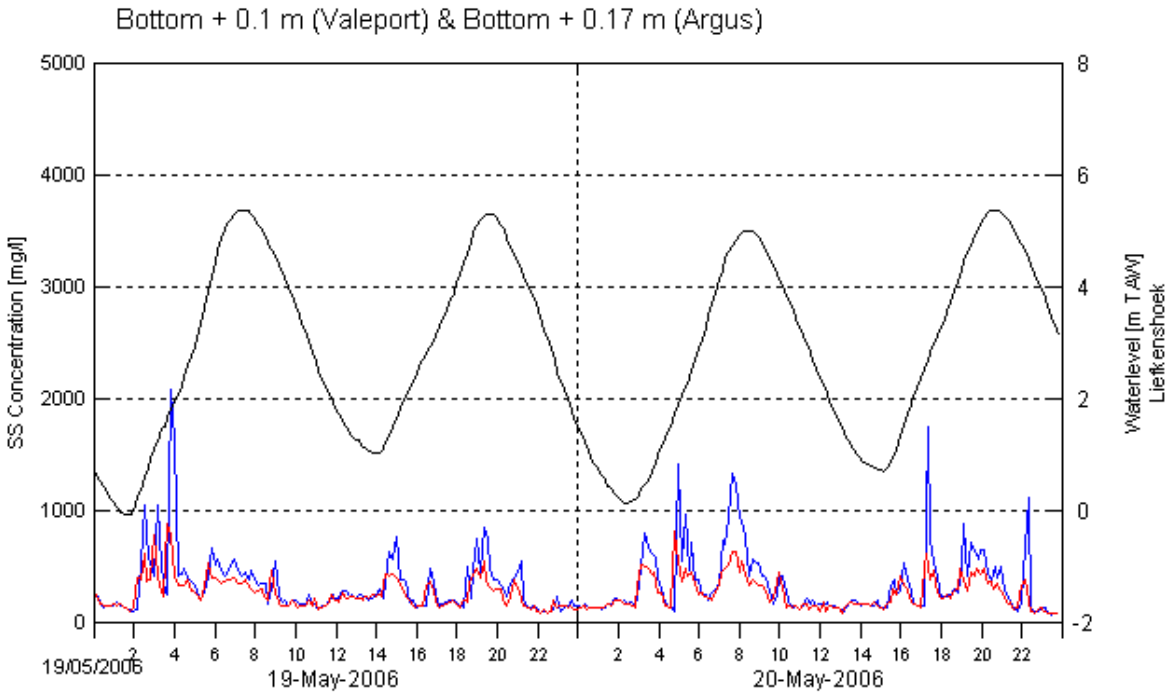
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

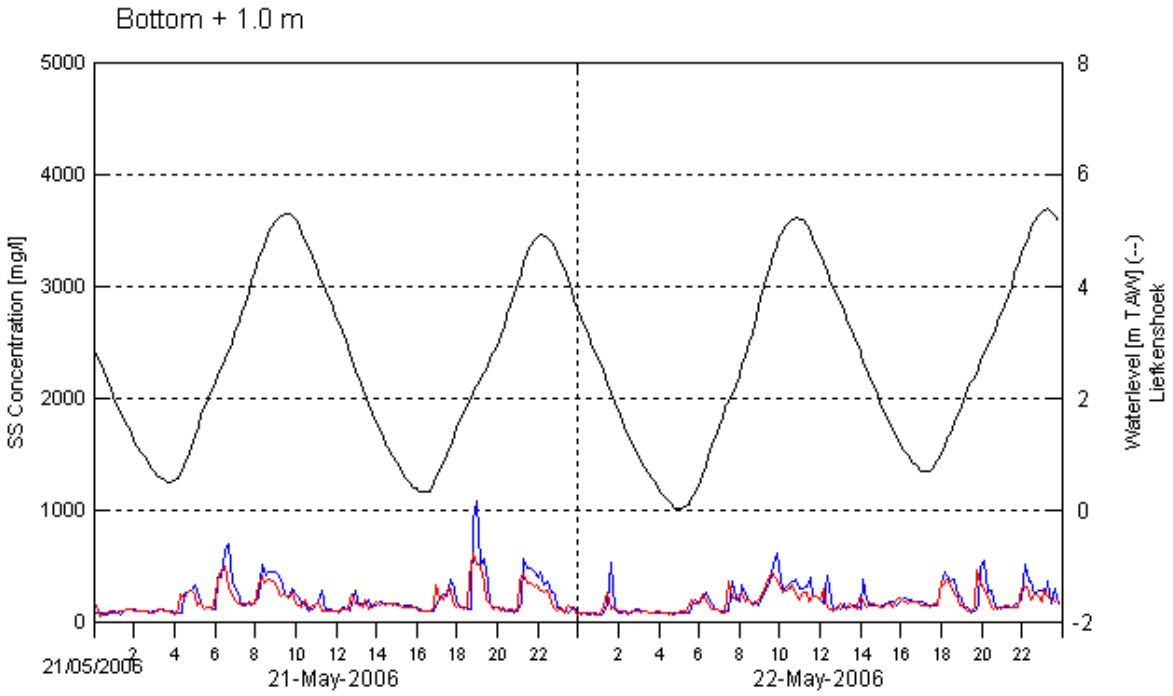
Date: 19/05/06 – 20/05/06

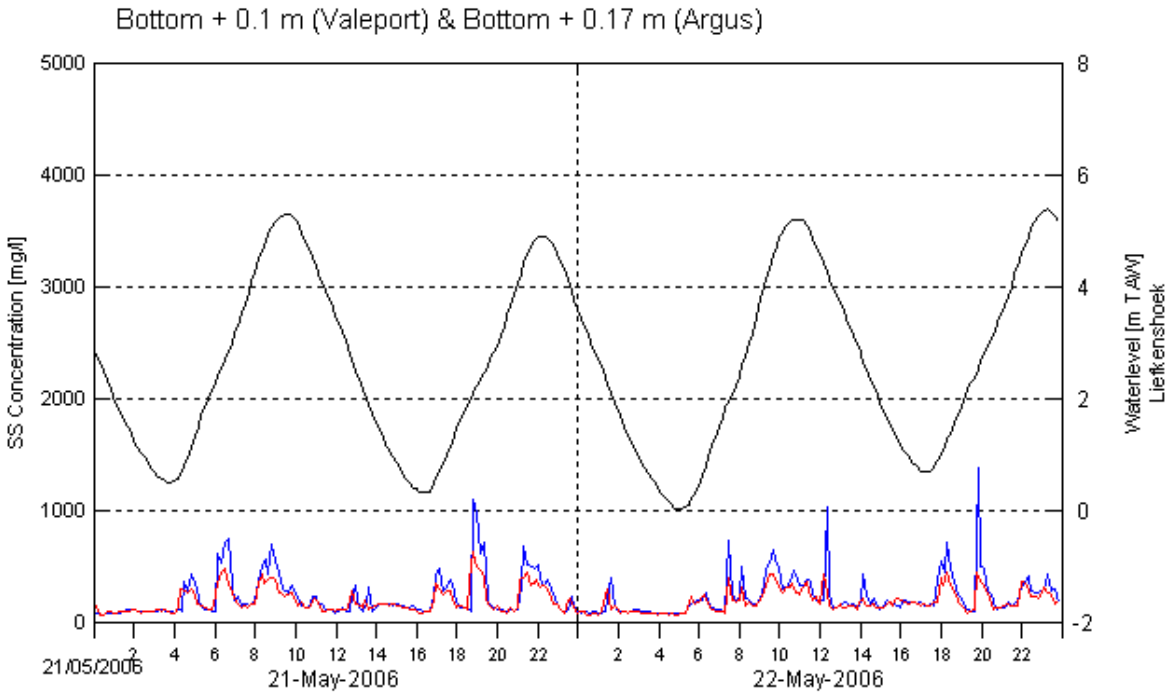
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location: Deurganckdok CDW

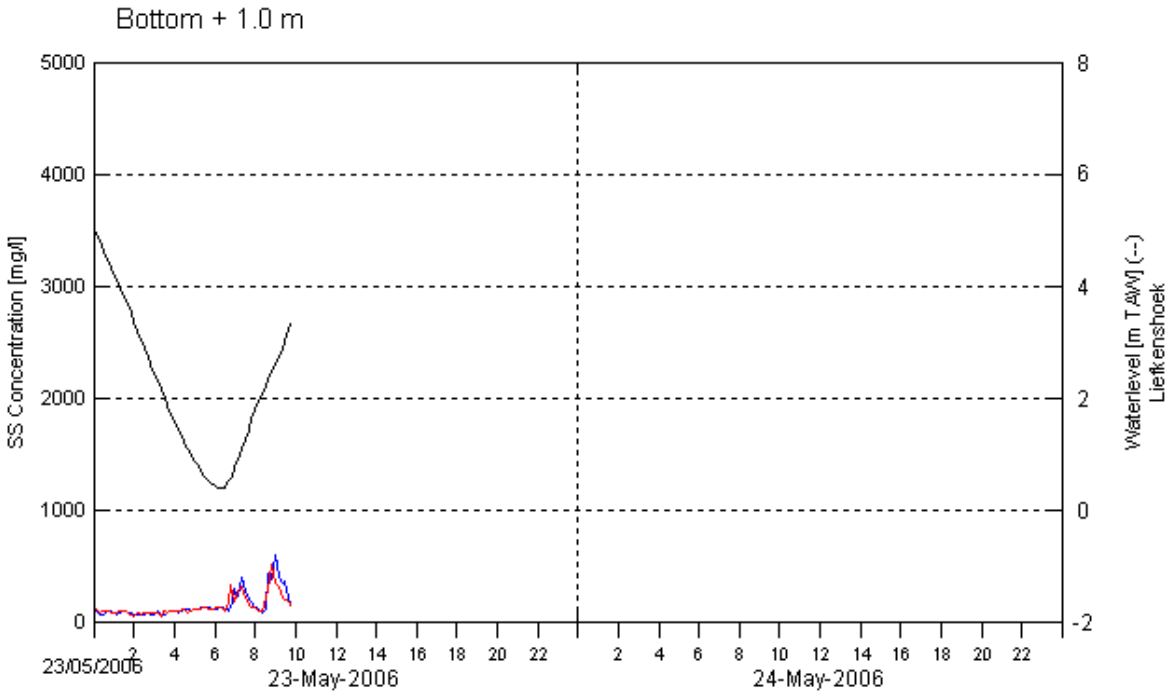
Date: 21/05/06 – 22/05/06

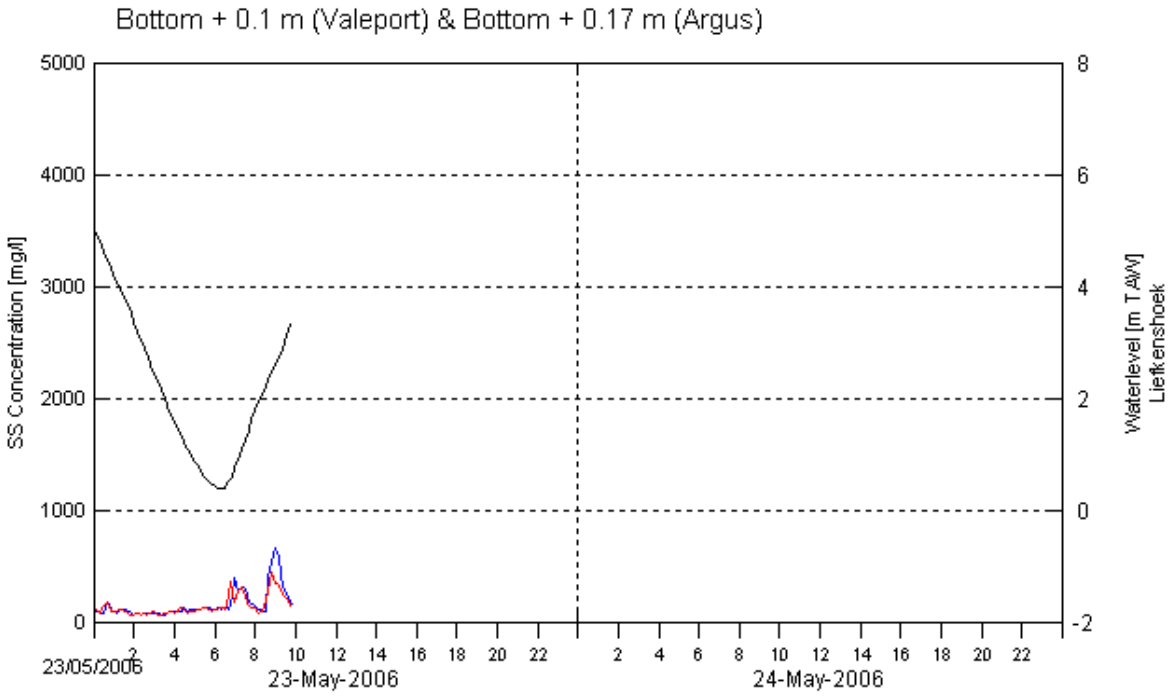
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location:	Date:
Deurganckdok CDW	23/05/06

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

Comparison of SS concentrations during each tidal phase

Date	Tide No.	Phase	Tidal Diff [m]	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
				UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060419	1	flood	3.5	221.8	-	137.9	1083
20060420	1	ebb	4.9	150.4	-	92.9	318.9
20060420	2	flood	5	265.9	-	147	389.9
20060420	2	ebb	4.9	112.1	-	67.6	240
20060420	3	flood	4.4	162.8	-	111.9	326
20060421	3	ebb	4.6	98.6	-	63.1	206.6
20060421	4	flood	4.6	227.4	-	150.7	419.8
20060421	4	ebb	4.3	106.3	-	58.4	175.8
20060421	5	flood	4	131.6	-	76.3	233.1
20060422	5	ebb	4.2	89	-	49.2	138.3
20060422	6	flood	4.3	189.5	-	119.1	266.7
20060422	6	ebb	4.2	131.8	-	78.6	187
20060422	7	flood	3.8	148.2	-	98.4	208.5
20060423	7	ebb	4	69.8	-	37.6	104.7
20060423	8	flood	4.8	184.6	-	115.7	237.6
20060423	8	ebb	4.4	80.9	-	40.5	111.6
20060423	9	flood	4.2	137.7	-	86.7	197.7
20060424	9	ebb	4.8	74.7	-	41.5	96.7
20060424	10	flood	5	246.5	-	154.9	255.2
20060424	10	ebb	4.9	124	-	79.2	201.4
20060425	11	flood	4.8	181.8	-	102.2	209.9
20060425	11	ebb	5.3	92.6	-	51	100
20060425	12	flood	5.8	192.7	-	119	213.3
20060425	12	ebb	5.3	101.7	-	54.3	117.4
20060426	13	flood	5.3	257.7	-	173.7	417.1
20060426	13	ebb	5.5	116.2	-	68.3	166.3
20060427	14	flood	5.8	155.5	-	173.7	75.1
20060427	14	ebb	6.1	129.7	-	163.1	851.7
20060427	15	flood	6.2	275.2	-	263.8	758.7
20060427	15	ebb	5.9	161.3	-	185.5	852.8
20060428	16	flood	5.8	218.5	-	231.4	945.9
20060428	16	ebb	6.1	155.8	-	174.9	792
20060428	17	flood	6.4	290	-	267.5	761.3
20060428	17	ebb	6	292.9	-	347.7	464
20060429	18	flood	5.9	330.5	-	309	1151.2
20060429	18	ebb	6.2	160.7	-	186.2	520.2
20060429	19	flood	6.1	263	-	238	432.8
20060429	19	ebb	6	134.3	-	169.4	255.3
20060430	20	flood	5.9	193	-	210.2	420.5
20060430	20	ebb	6.1	124.5	-	155.8	240.3
20060430	21	flood	5.9	135.8	-	165.8	268.4
20060501	21	ebb	5.9	125.2	-	163.1	228.4

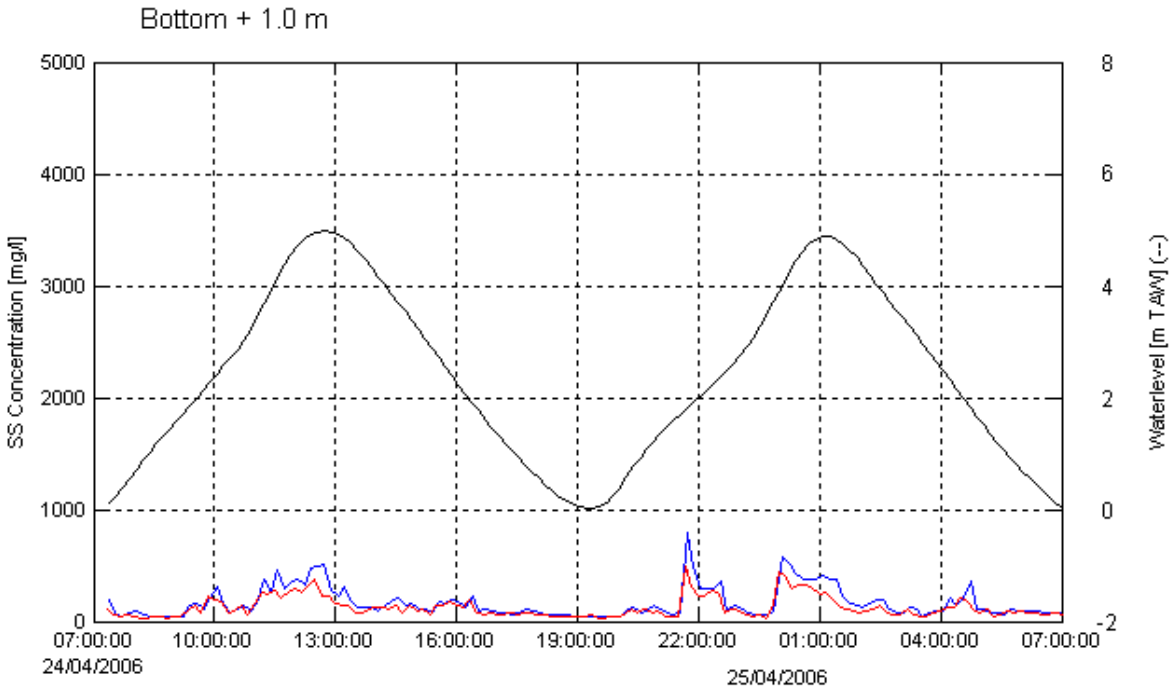
Comparison of SS concentrations during each tidal phase

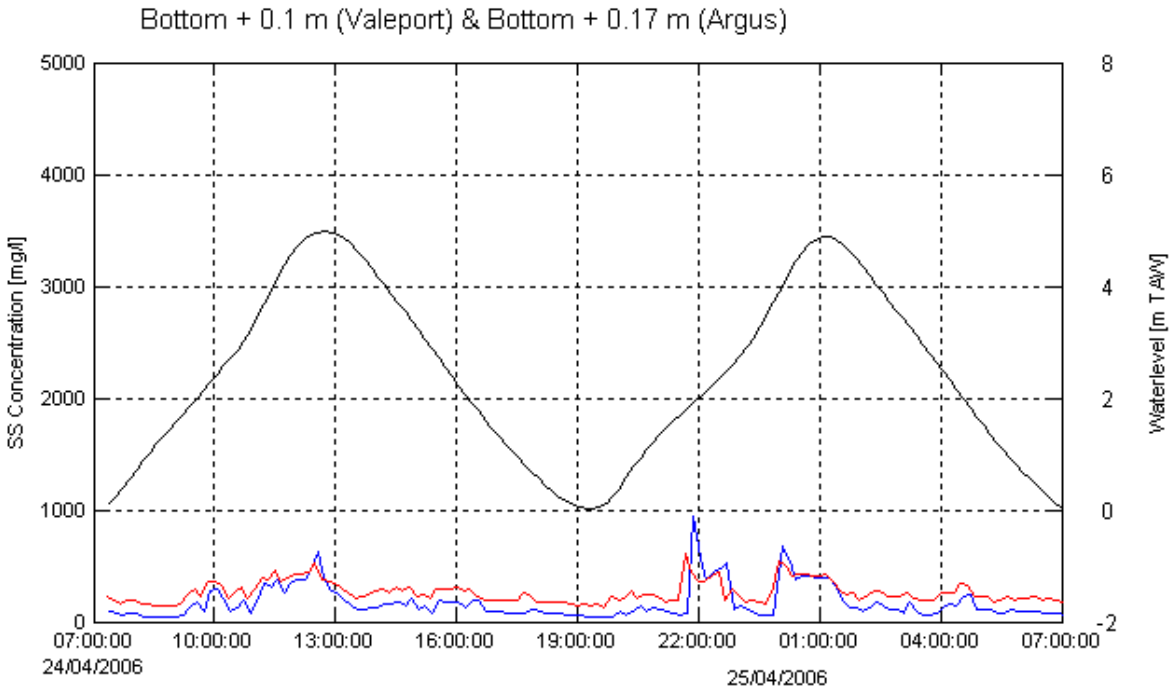
Date	Tide No.	Phase	Tidal Diff	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
			[m]	UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060501	22	flood	5.8	173.2	-	173.8	710.1
20060501	22	ebb	5.8	125.5	-	155	216.7
20060501	23	flood	5.6	226.4	-	233	330.1
20060502	23	ebb	5.4	148.7	-	162.6	175.2
20060502	24	flood	5.6	168.9	-	177.9	379.8
20060502	24	ebb	5.3	156.2	-	171.1	191.5
20060502	25	flood	5	253.9	-	227	312.2
20060503	25	ebb	5.4	182.3	-	198.2	314.7
20060503	26	flood	5.2	420.4	-	396.5	1005.4
20060503	26	ebb	4.8	188.3	-	216.4	2480.1
20060503	27	flood	4.8	287.3	-	275.6	452.5
20060504	27	ebb	4.9	182.8	-	202.7	426.9
20060504	28	flood	4.9	304.5	-	325.8	-
20060504	28	ebb	4.4	206.4	-	206.7	-
20060504	29	flood	4.1	276.7	-	261.9	-
20060505	29	ebb	4.4	210.4	-	224.9	-
20060505	30	flood	4.4	418.6	-	380.1	-
20060505	30	ebb	4	330.9	-	311.2	-
20060505	31	flood	3.7	329.7	-	320.1	-
20060506	31	ebb	3.8	166.4	-	196.6	-
20060506	32	flood	4.1	308.7	-	278.8	-
20060506	32	ebb	3.9	105.9	-	150.3	-
20060506	33	flood	3.5	134.7	-	165.1	-
20060507	33	ebb	3.8	87.2	-	136.2	-
20060507	34	flood	4.1	195.6	-	217.2	-
20060507	34	ebb	3.9	89.6	-	134.8	-
20060507	35	flood	3.7	128.9	-	153.5	-
20060508	35	ebb	4.2	82.6	-	126.8	-
20060508	36	flood	4.5	189.4	-	207.3	-
20060508	36	ebb	4.3	112.5	-	146.8	-
20060509	37	flood	4.3	165.4	-	195.2	-
20060509	37	ebb	4.4	101	-	144.2	-
20060509	38	flood	4.8	209	-	220	-
20060509	38	ebb	4.6	98.6	-	161.8	-
20060510	39	flood	4.5	199.1	-	240.1	-
20060510	39	ebb	5	91.6	-	169.2	-
20060511	40	flood	5.1	165.9	-	223.1	-
20060511	40	ebb	5.2	133.9	-	200.1	-
20060511	41	flood	5.3	289.9	-	321	-
20060511	41	ebb	5.3	182.5	-	233.1	-
20060512	42	flood	5.2	244.3	-	294.7	-
20060512	42	ebb	5.4	163.1	-	224.6	-
20060512	43	flood	5.5	425.1	-	436.3	-

Comparison of SS concentrations during each tidal phase

Date	Tide No.	Phase	Tidal Diff	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
			[m]	UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060512	43	ebb	5.5	168.6	-	236.6	-
20060513	44	flood	5.5	368.9	-	415	-
20060513	44	ebb	5.5	161	-	216.3	-
20060513	45	flood	5.7	313.6	-	357.9	-
20060513	45	ebb	5.5	161.3	-	227	-
20060514	46	flood	5.4	256	-	296	-
20060514	46	ebb	5.6	209.1	-	267.9	-
20060514	47	flood	5.6	230	-	260.5	-
20060514	47	ebb	5.7	151.8	-	191.9	-
20060515	48	flood	5.5	216.6	-	222.7	-
20060515	48	ebb	5.6	206.6	-	237.9	-
20060515	49	flood	5.2	199.2	-	230.8	-
20060515	49	ebb	5.5	294.6	-	289.2	-
20060516	50	flood	5.6	242.8	-	268.7	-
20060516	50	ebb	5.5	170.3	-	195.5	-
20060516	51	flood	5.4	278.3	-	283.5	-
20060517	51	ebb	5.5	138.6	-	177.5	-
20060517	52	flood	5.5	295.8	-	300.7	-
20060517	52	ebb	5.5	189.4	-	223.7	-
20060517	53	flood	5.1	245.9	-	275.9	-
20060518	53	ebb	5.4	163.8	-	232.3	-
20060518	54	flood	5.6	549.7	-	585.2	-
20060518	54	ebb	5.1	292.1	-	307.9	-
20060518	55	flood	4.9	449.5	-	504.5	-
20060519	55	ebb	5.1	215.7	-	305.4	-
20060519	56	flood	5.4	488.1	-	731.9	-
20060519	56	ebb	4.3	262.5	-	405.6	-
20060519	57	flood	4.3	250.3	-	527.6	-
20060520	57	ebb	5.2	204.4	-	488.9	-
20060520	58	flood	4.9	336.9	-	657.8	-
20060520	58	ebb	4.3	234.8	-	649	-
20060520	59	flood	4.6	401	-	956.2	-
20060521	59	ebb	4.9	188.6	-	489	-
20060521	60	flood	4.8	255.7	-	638.6	-
20060521	60	ebb	5	198.6	-	623.8	-
20060521	61	flood	4.6	263.9	-	819.9	-
20060522	61	ebb	4.9	209.8	-	716.8	-
20060522	62	flood	5.2	456.3	-	1131.9	-
20060522	62	ebb	4.5	401.1	-	943.7	-
20060522	63	flood	4.7	377.5	-	1329.4	-
20060523	63	ebb	4.9	163.7	-	838.4	-

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 1.0 and 0.1 m above the bottom for SS concentration

Location:	Date:
Deurganckdok CDW	Avg Tide 24/04 – 25/04

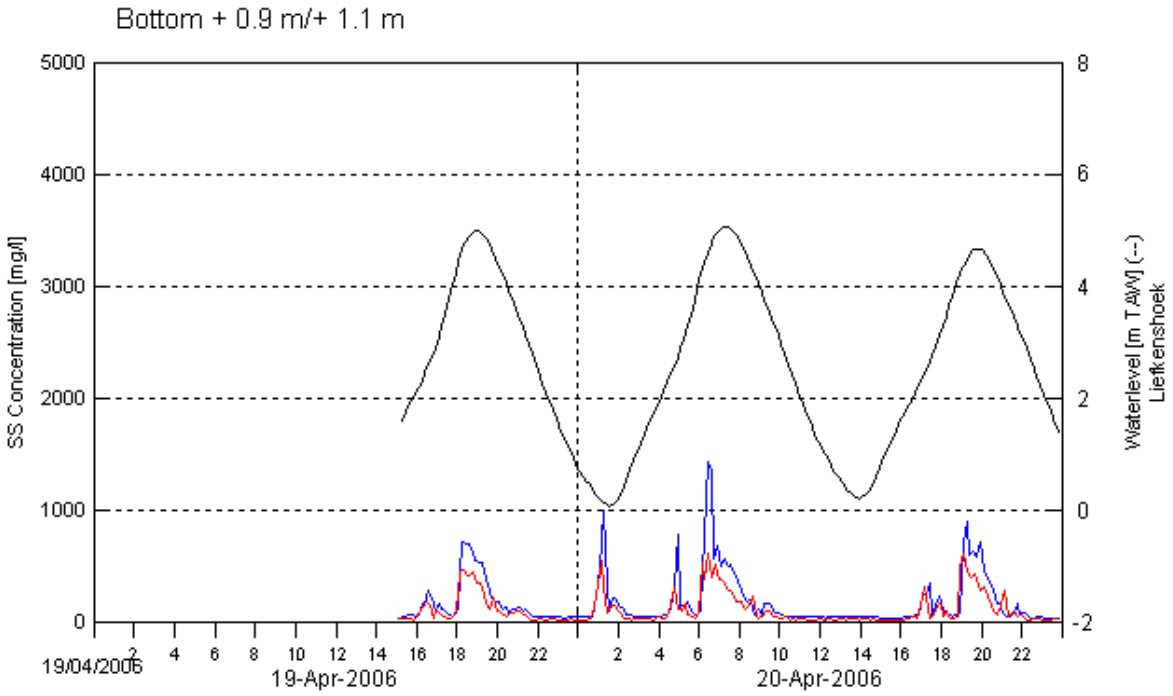
Data processed by: IMDC

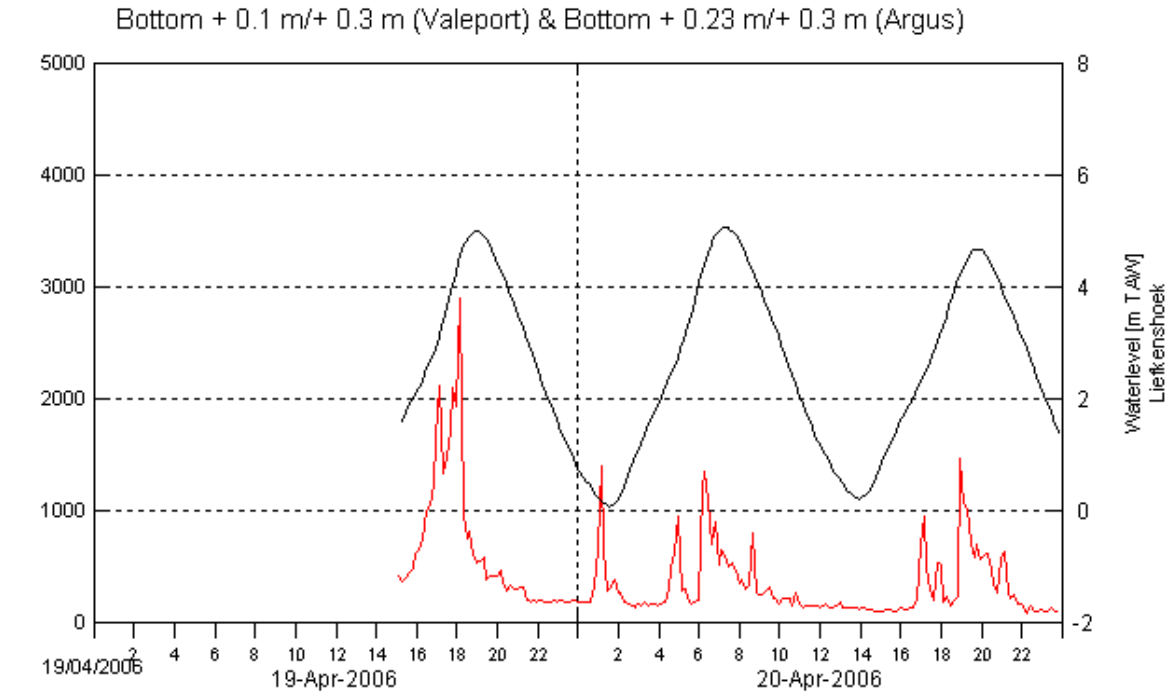
In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

E.2 Sill Frame

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

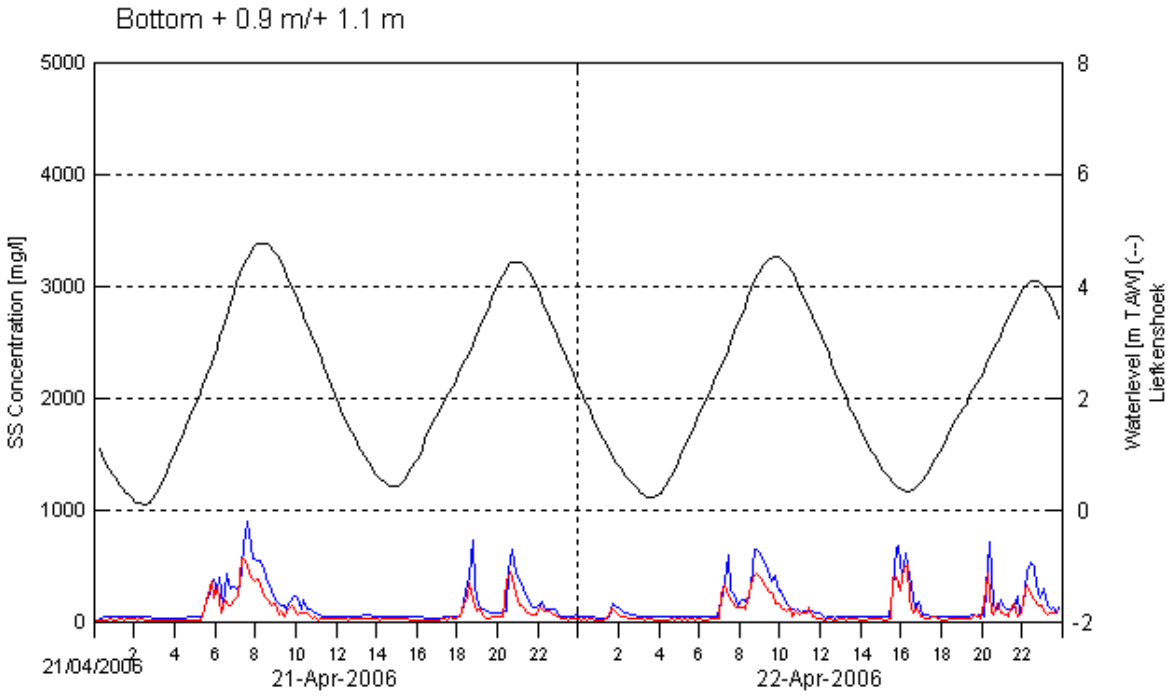
Date: 19/04/06 – 20/04/06

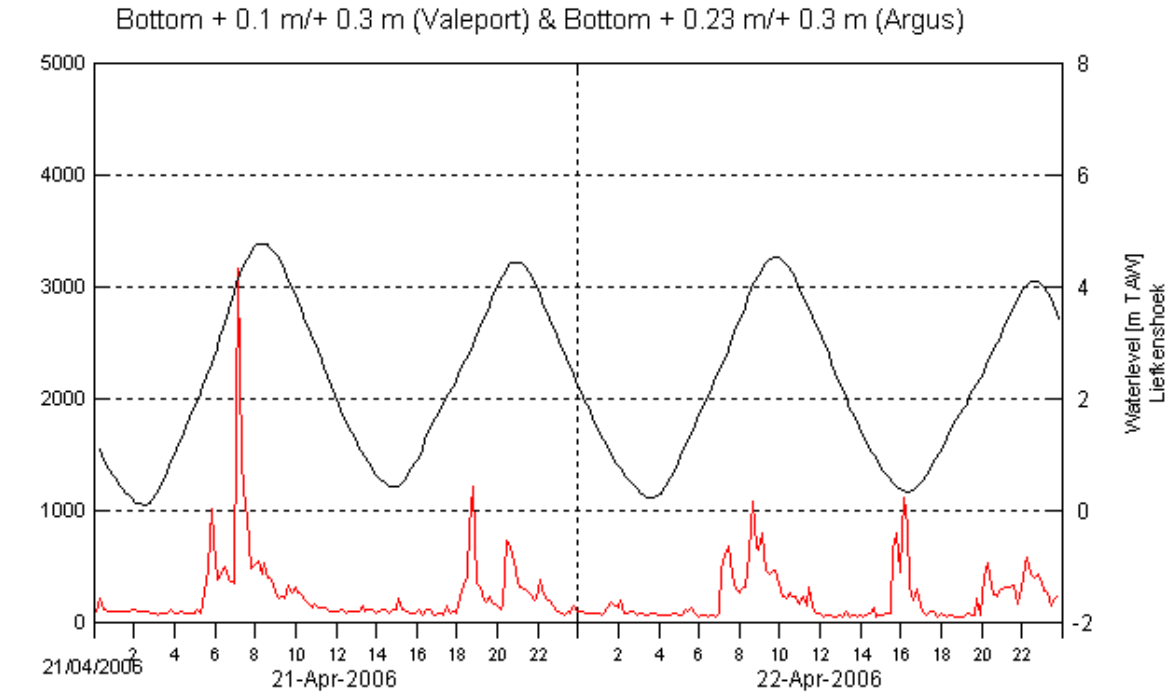
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

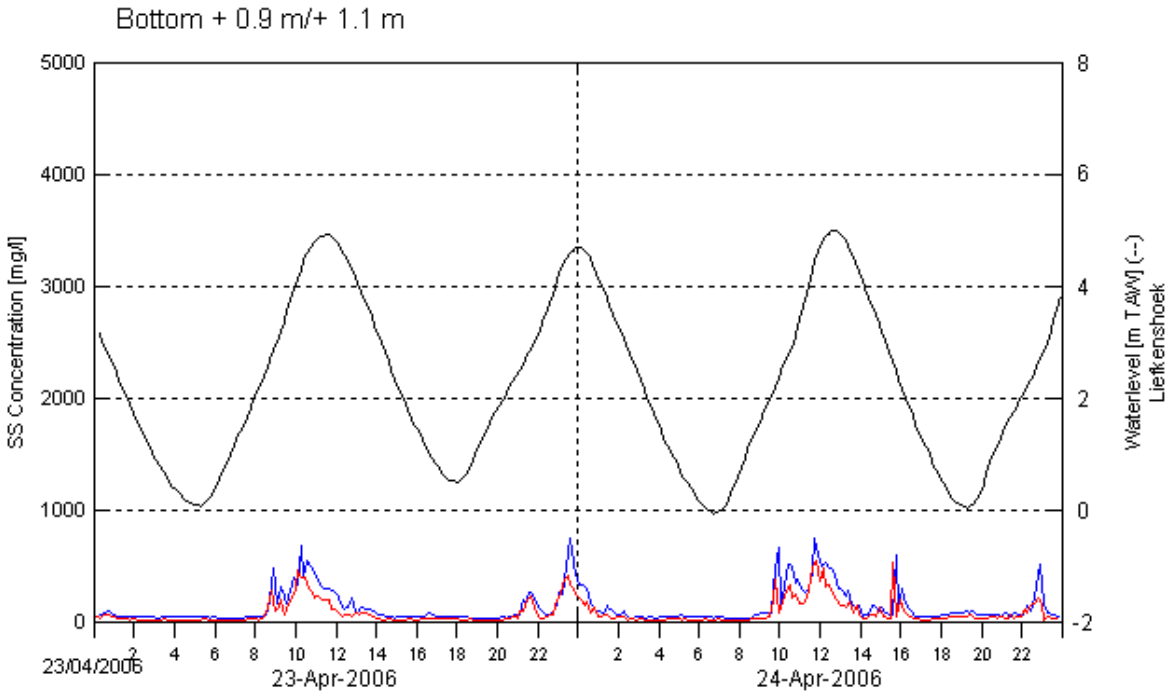
Date: 21/04/06 – 22/04/06

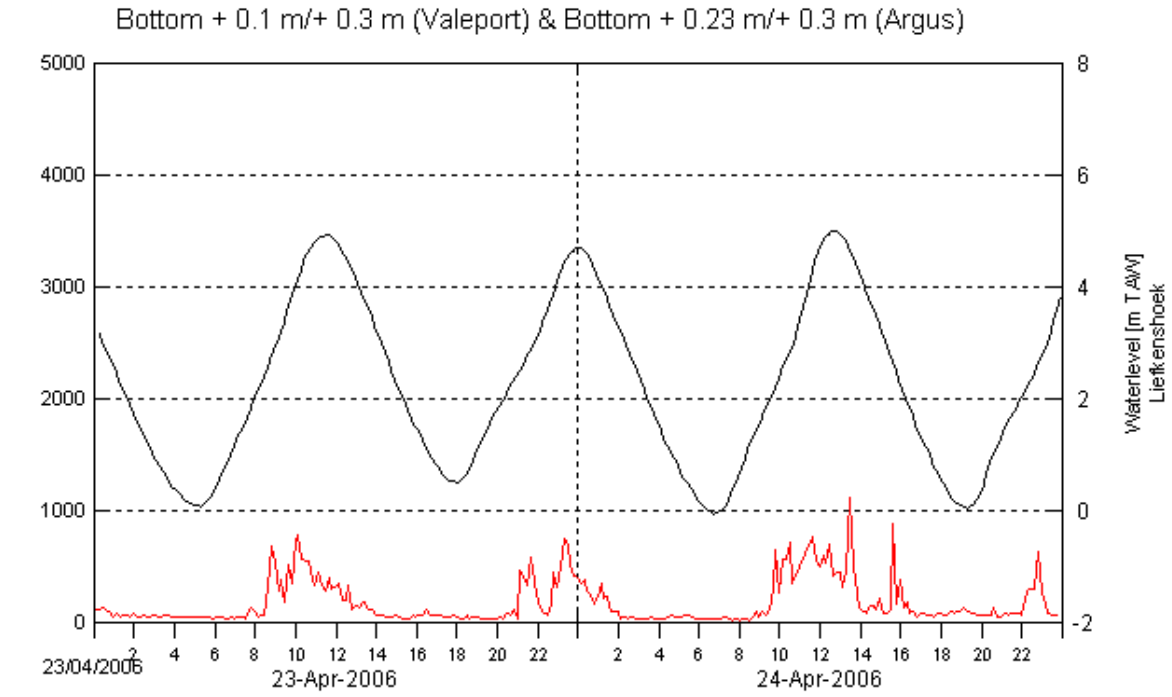
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

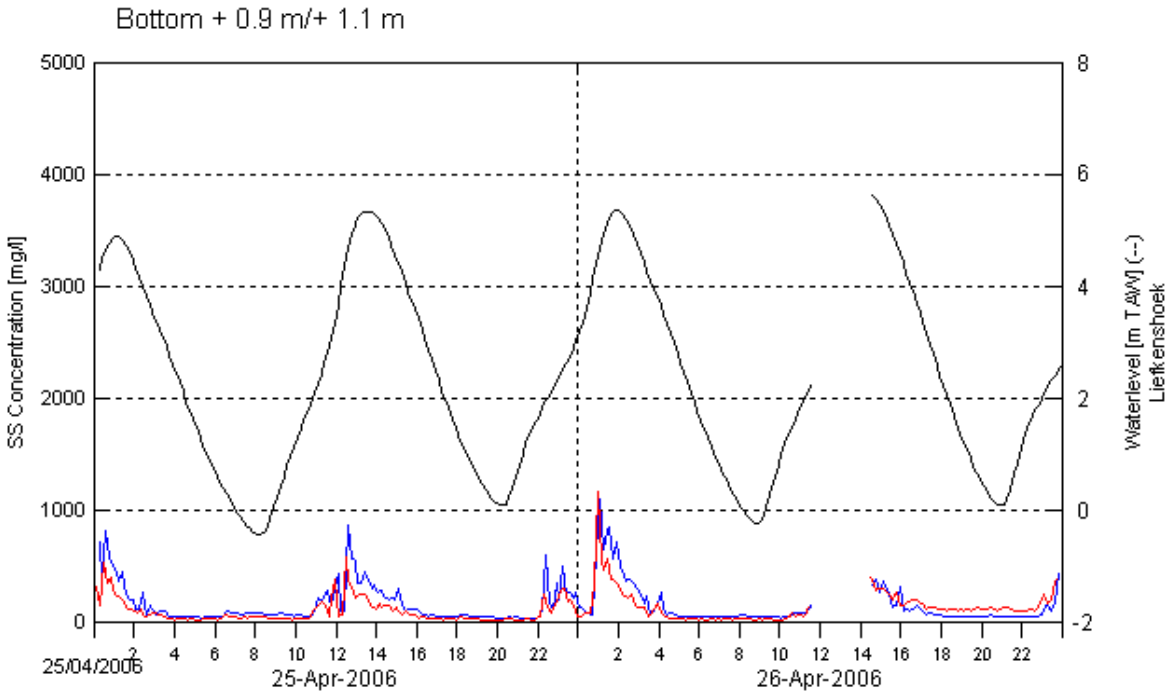
Date: 23/04/06 – 24/04/06

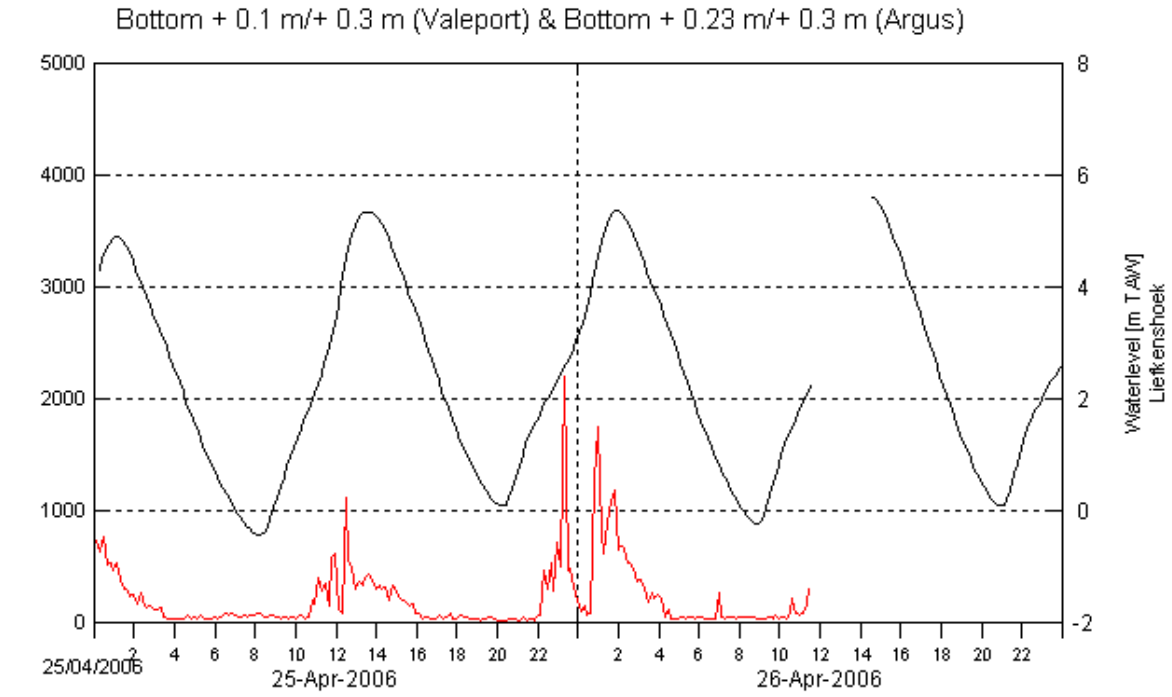
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

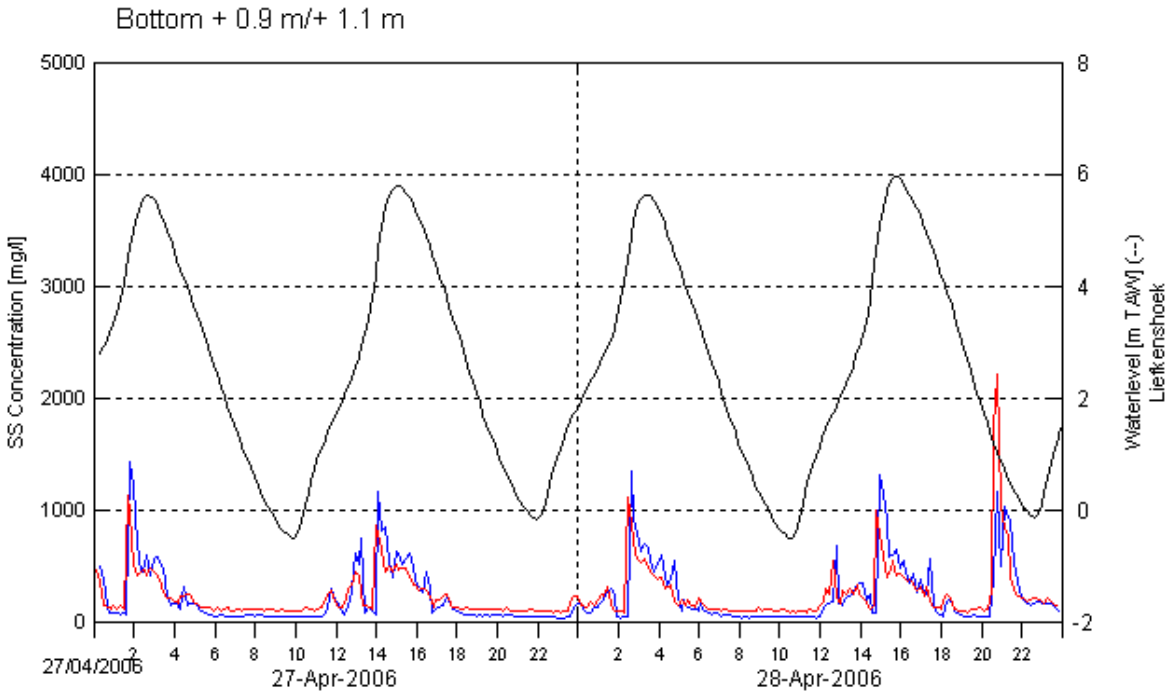
Date: 25/04/06 – 26/04/06

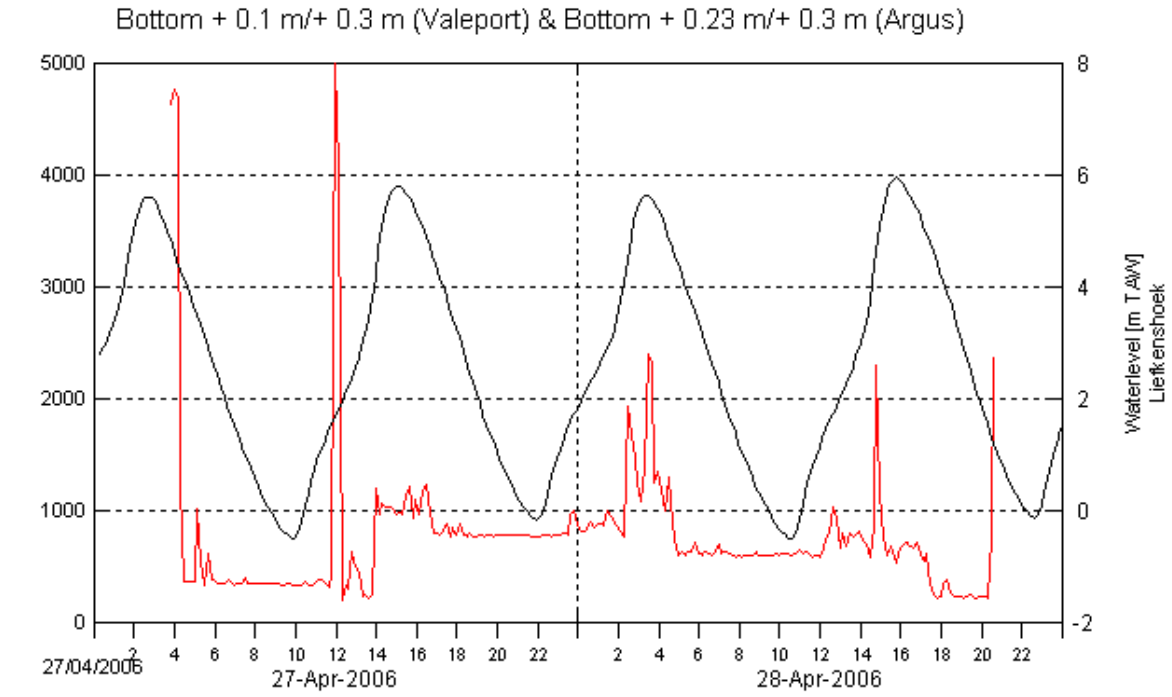
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

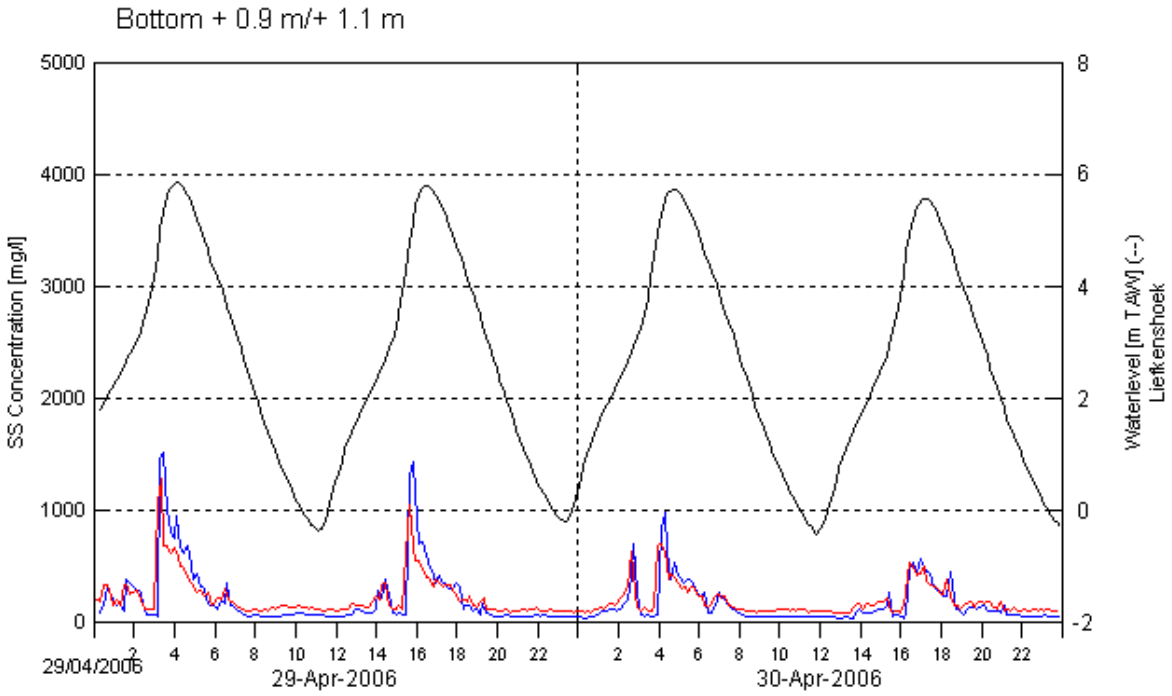
Date: 27/04/06 – 28/04/06

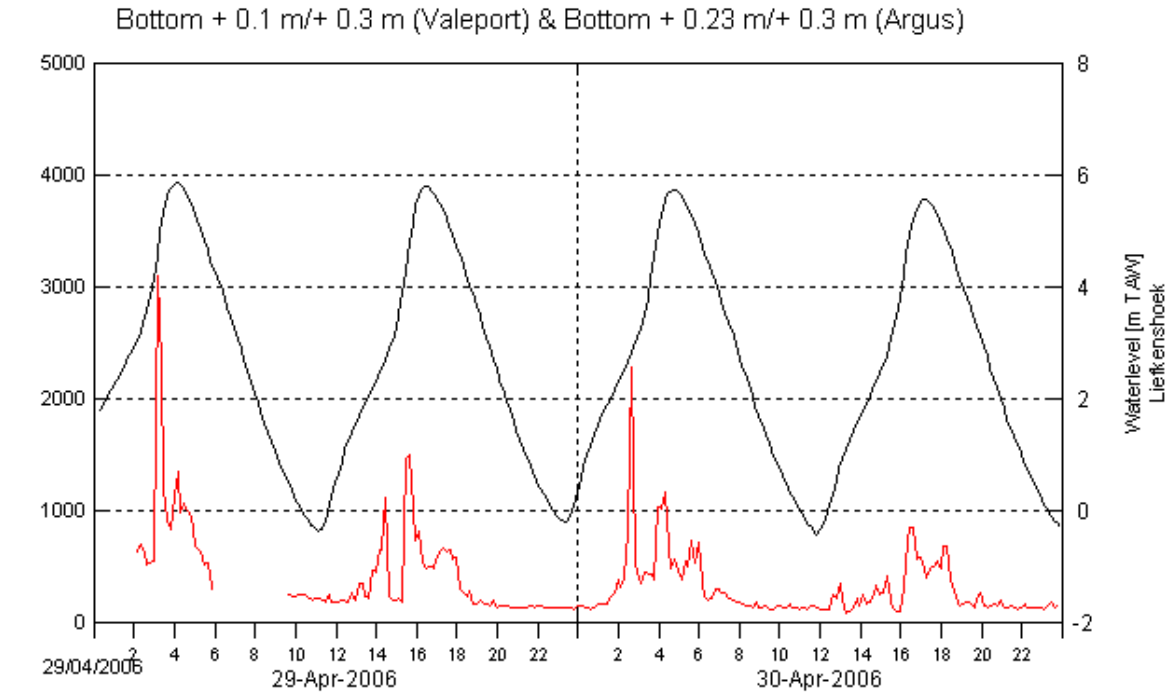
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

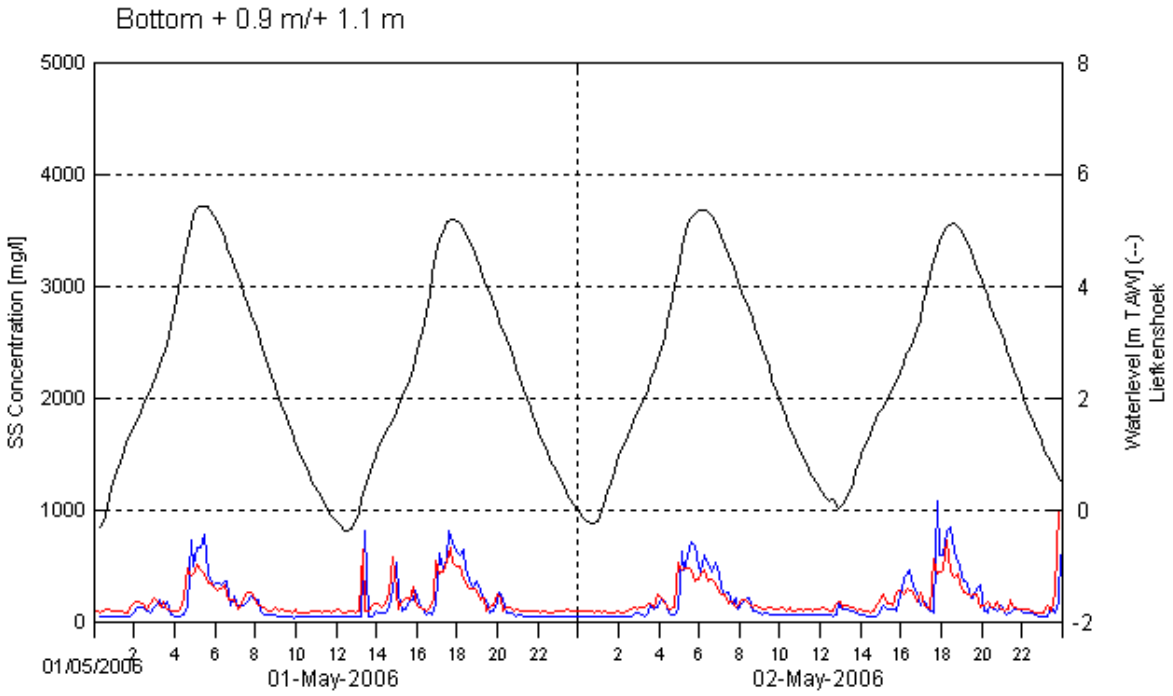
Date: 29/04/06 – 30/04/06

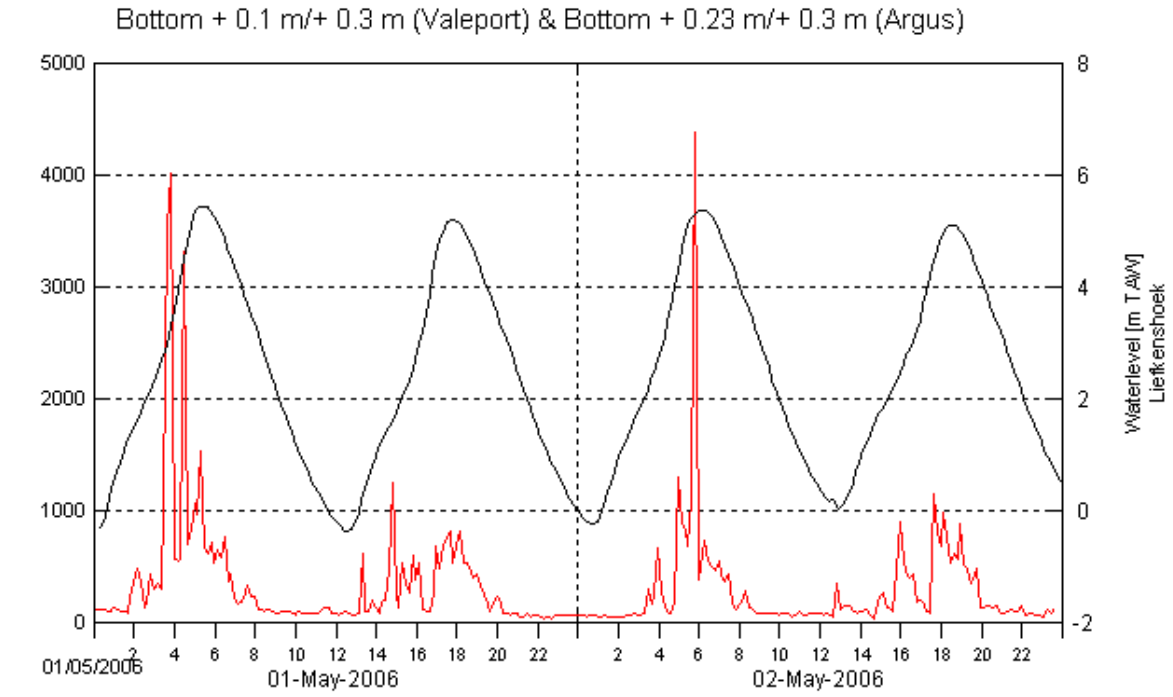
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

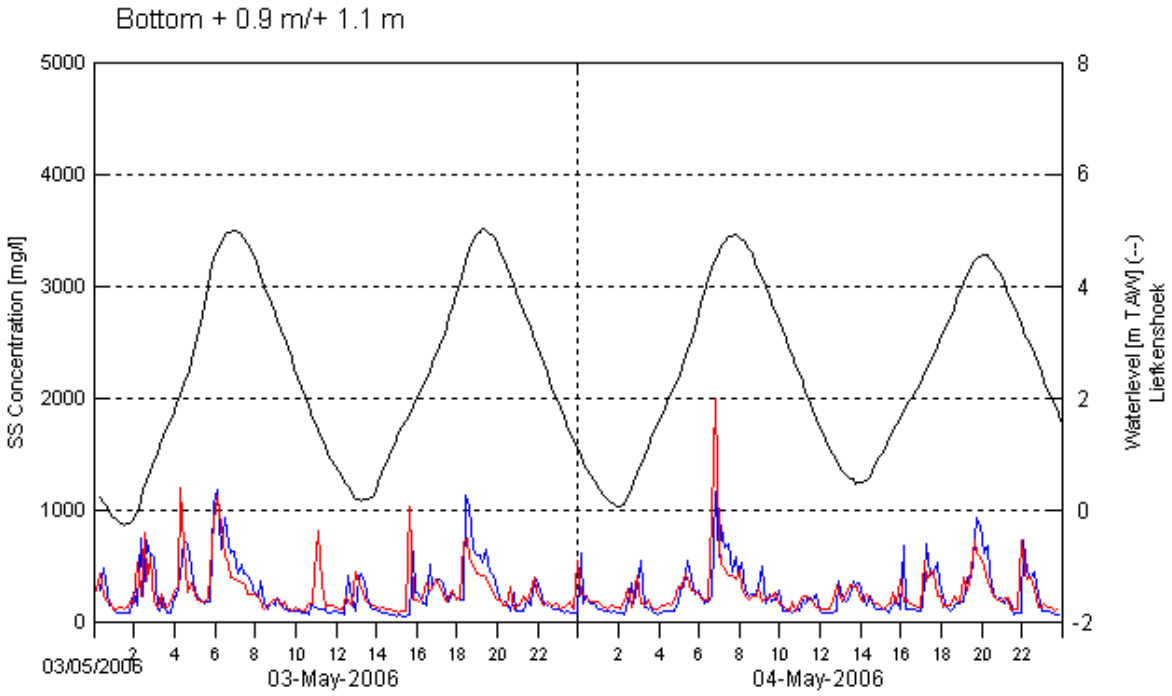
Date: 01/05/06 – 02/05/06

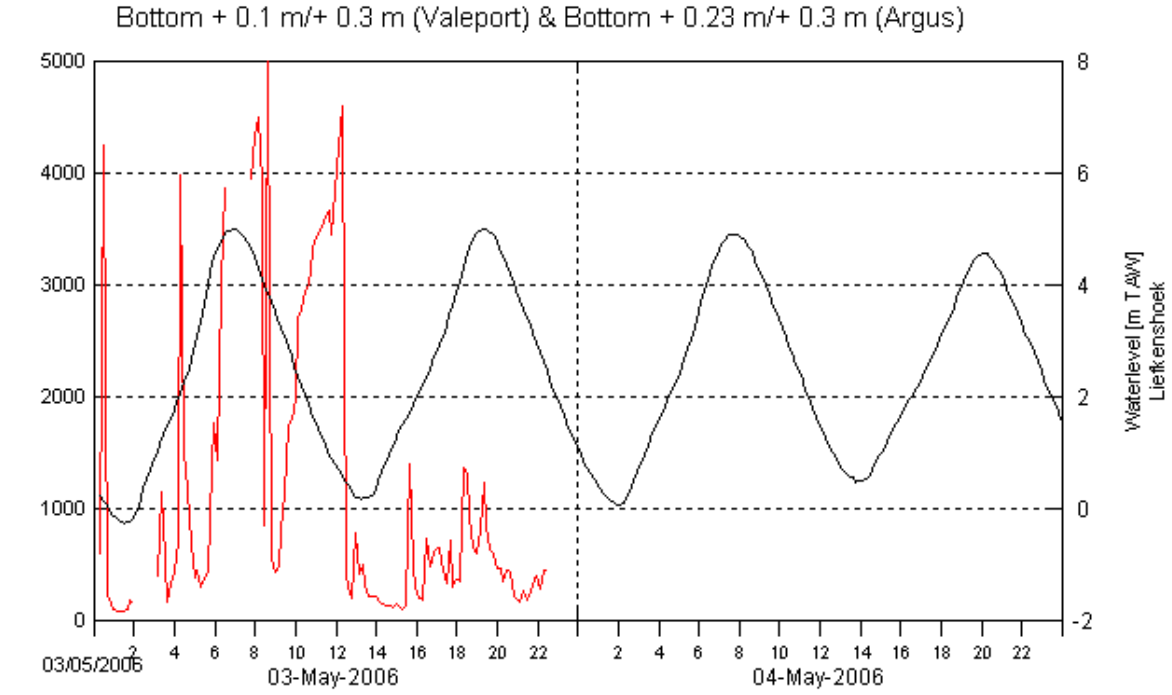
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

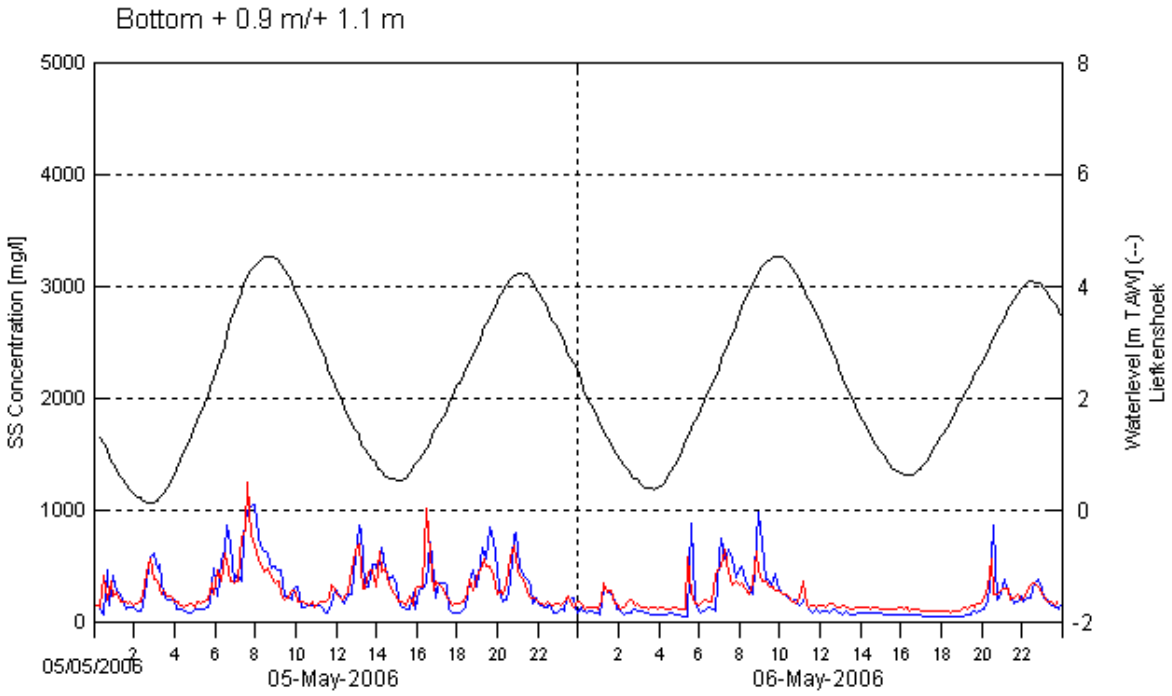
Date: 03/05/06 – 04/05/06

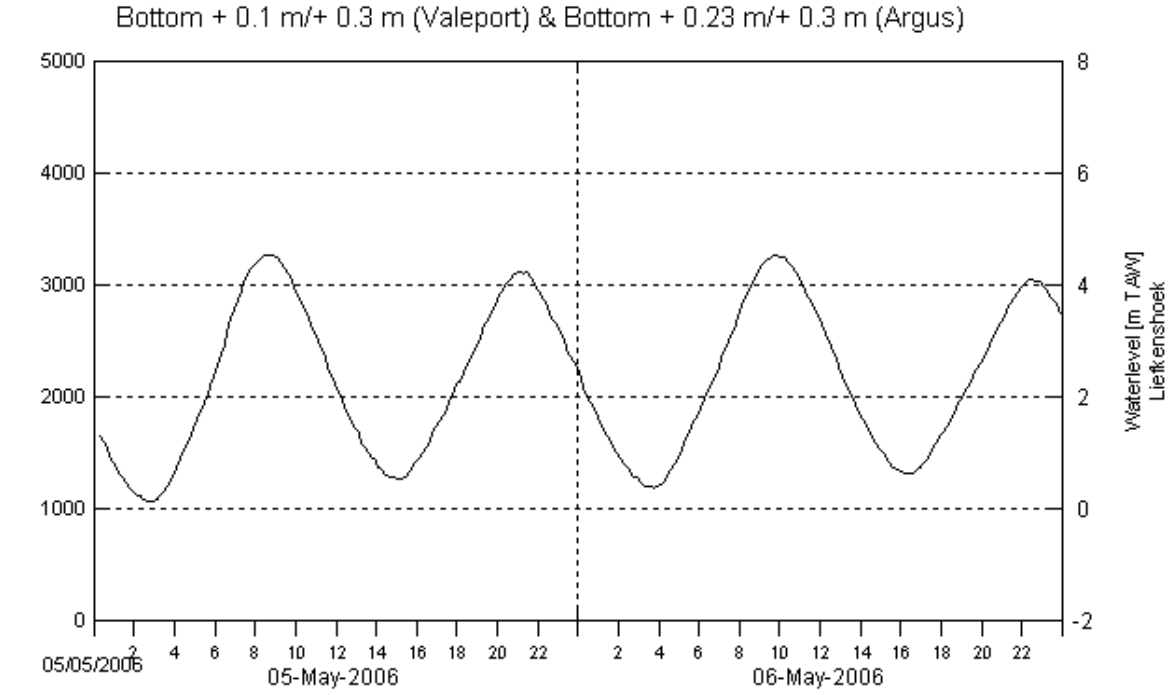
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

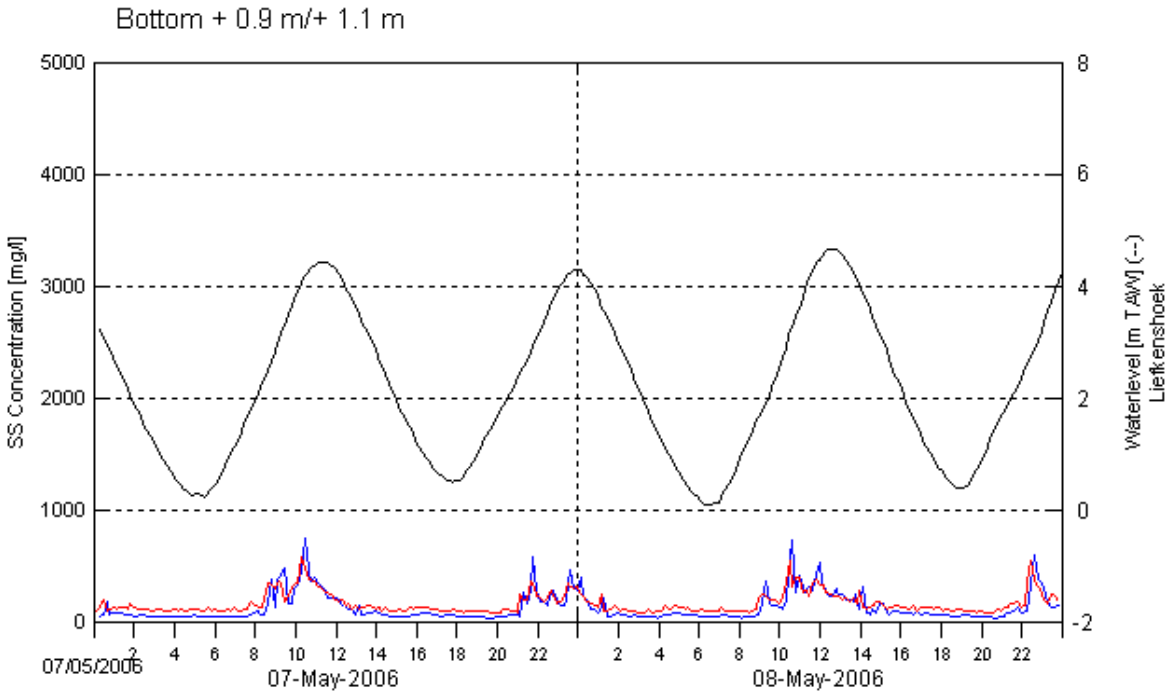
Date: 05/05/06 – 06/05/06

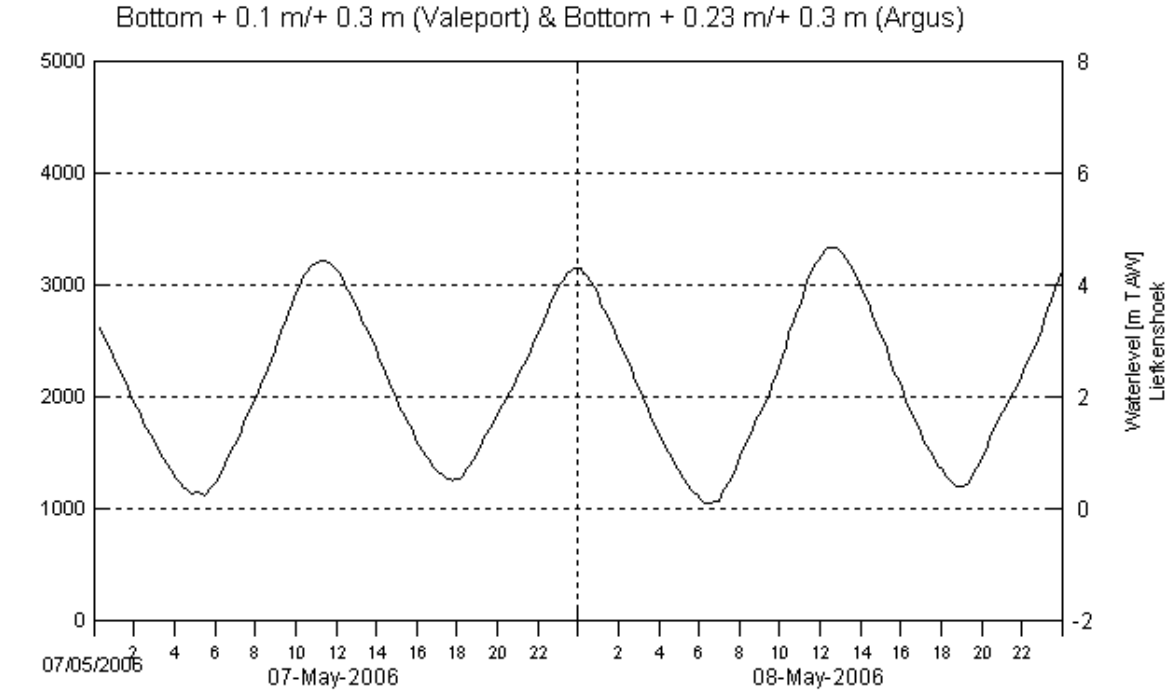
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

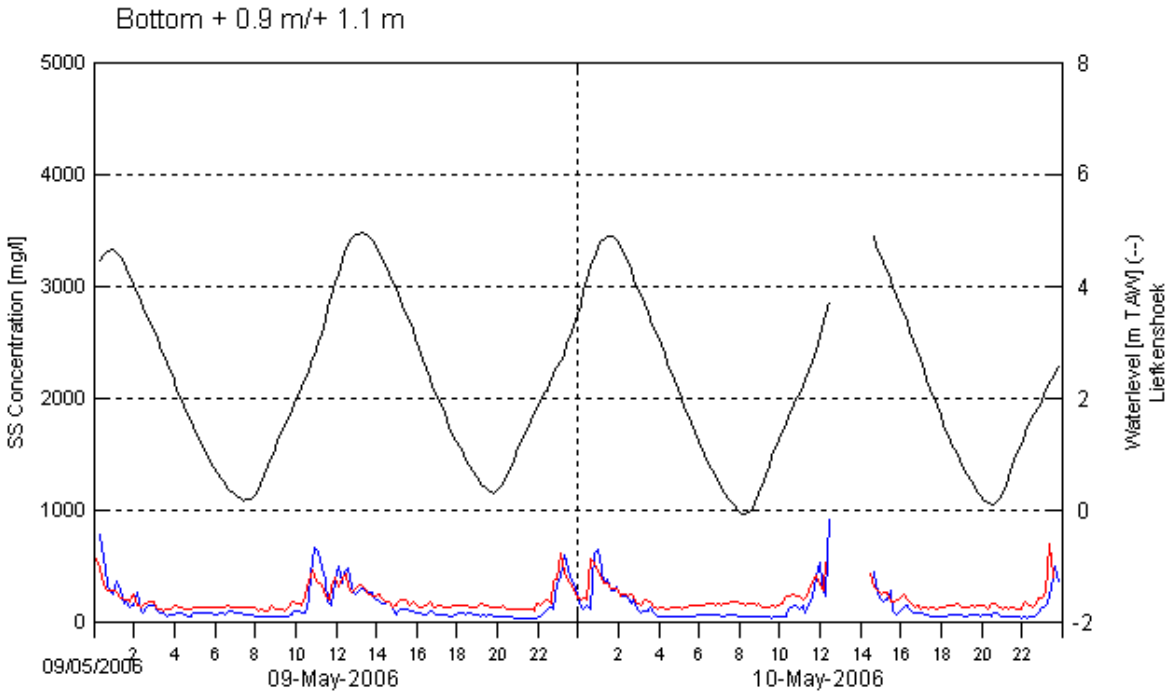
Date: 07/05/06 – 08/05/06

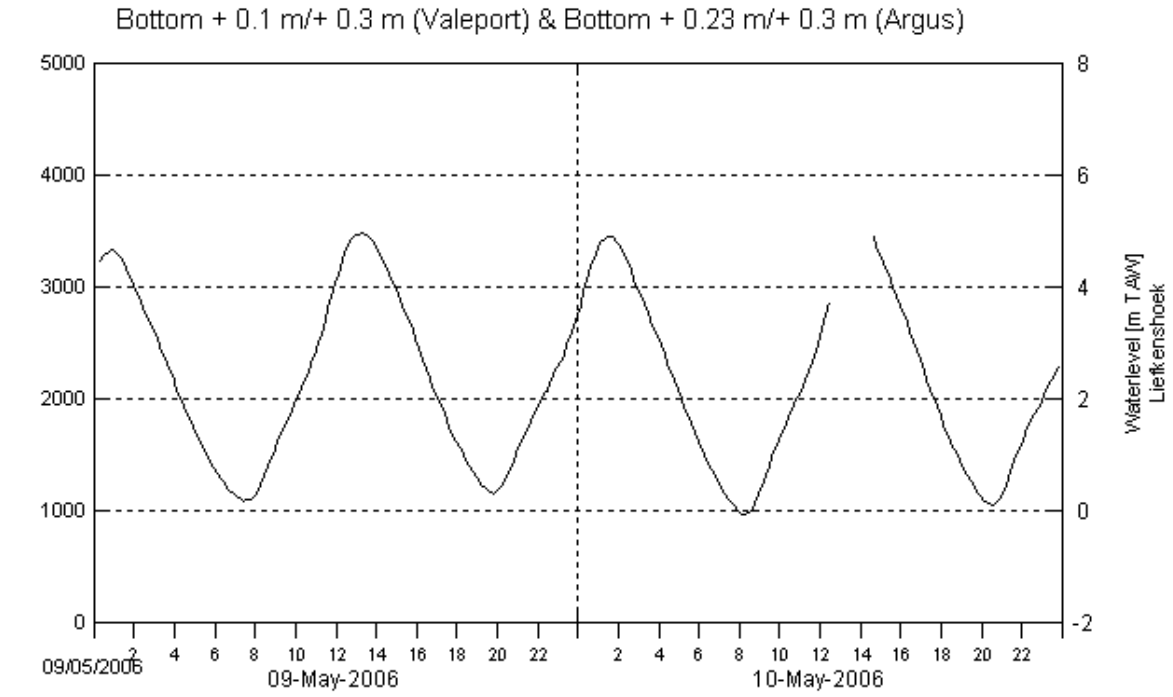
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

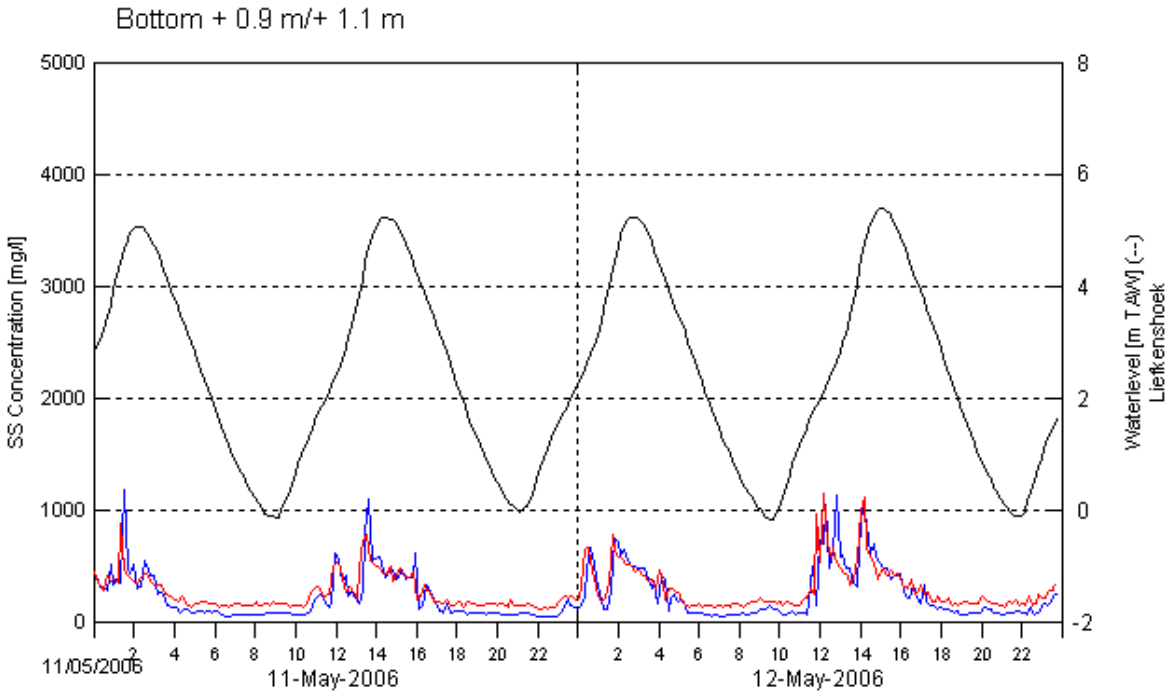
Date: 09/05/06 – 10/05/06

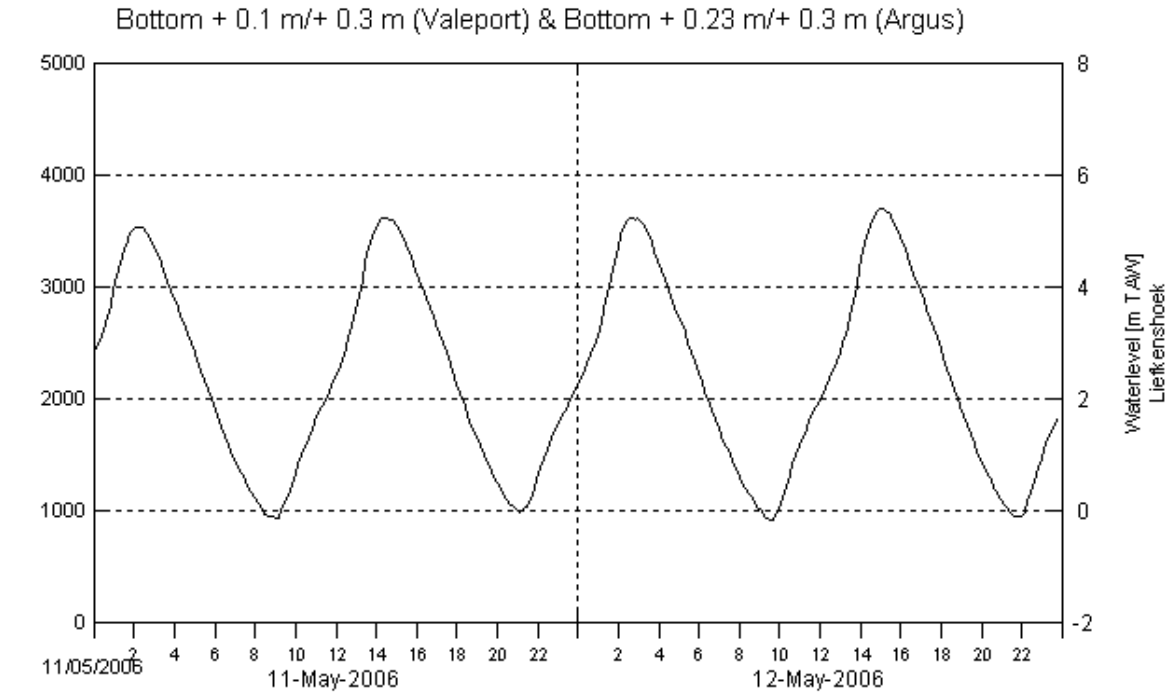
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

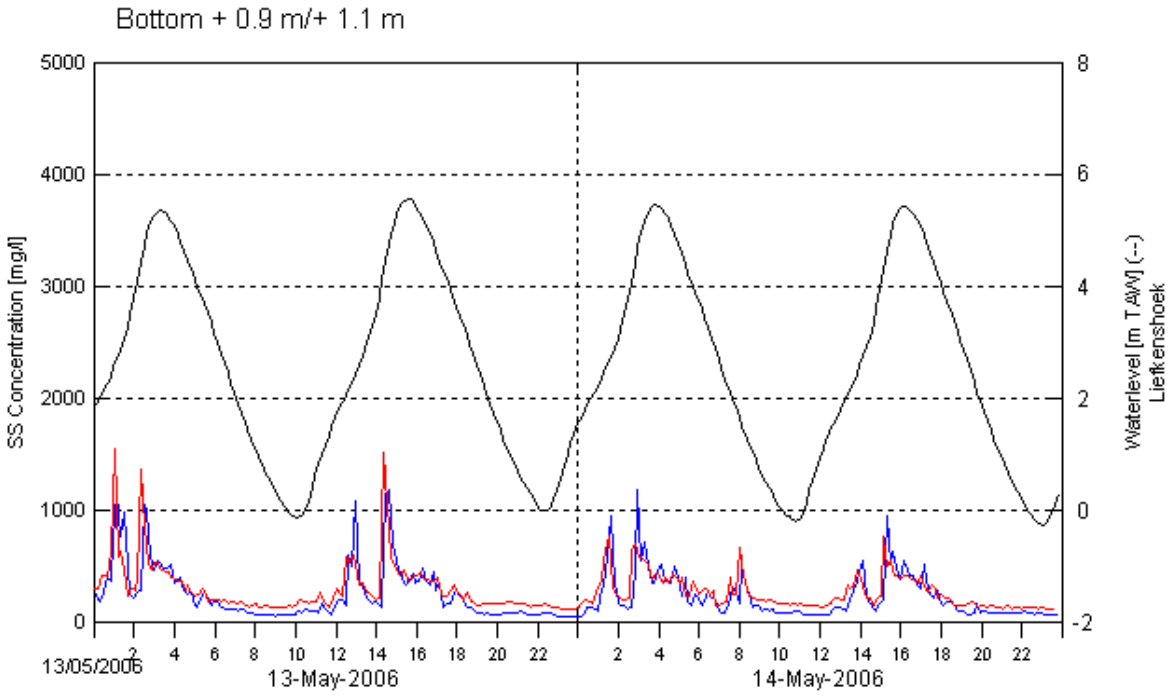
Date: 11/05/06 – 12/05/06

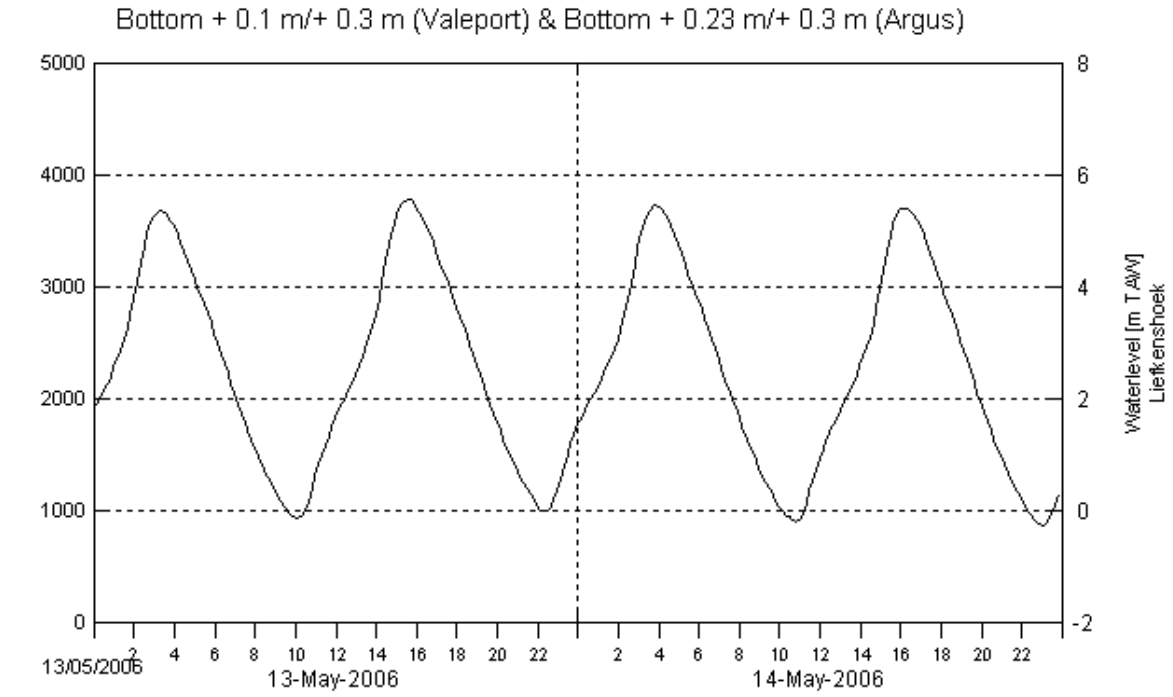
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

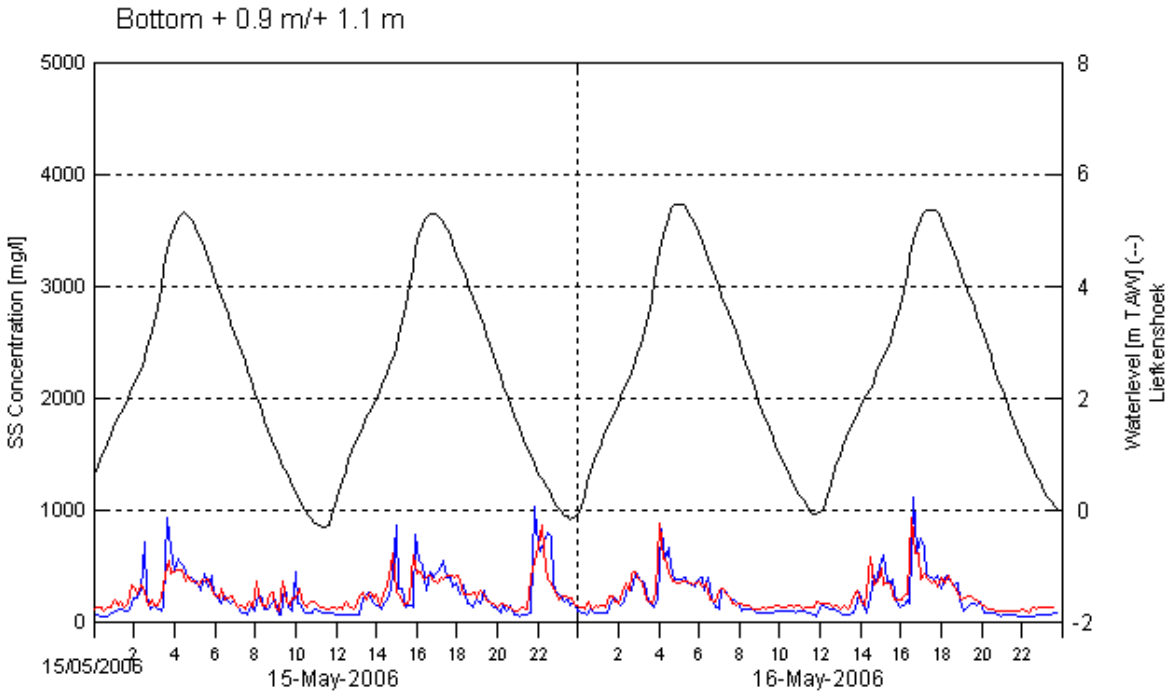
Date: 13/05/06 – 14/05/06

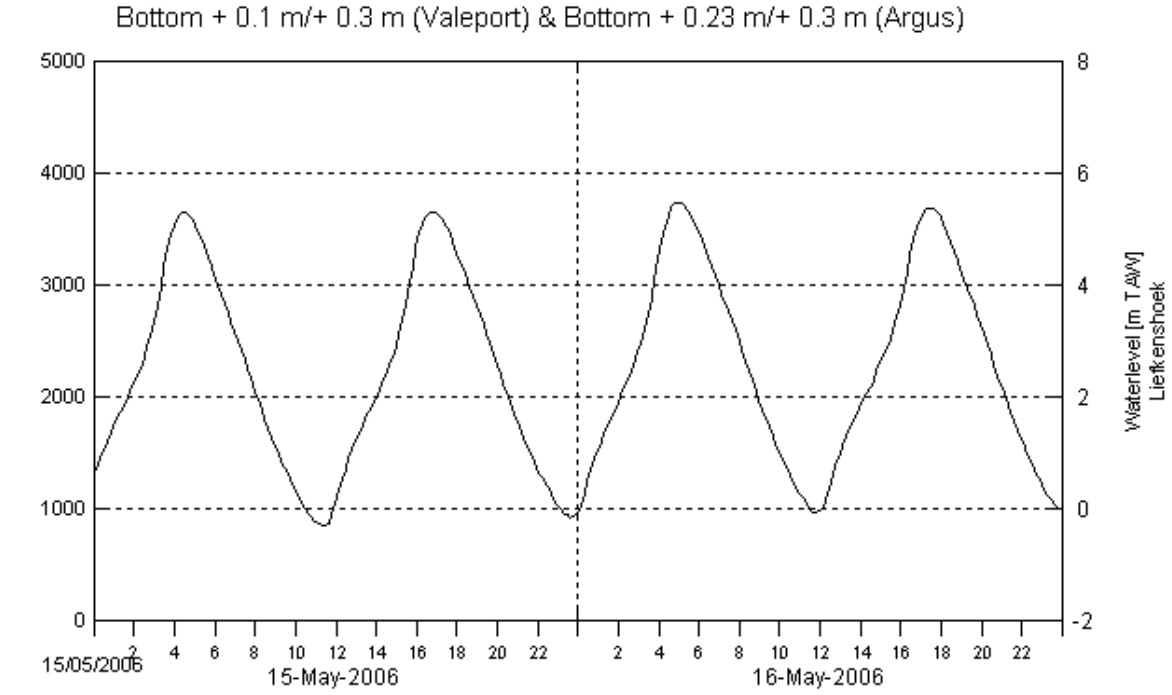
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

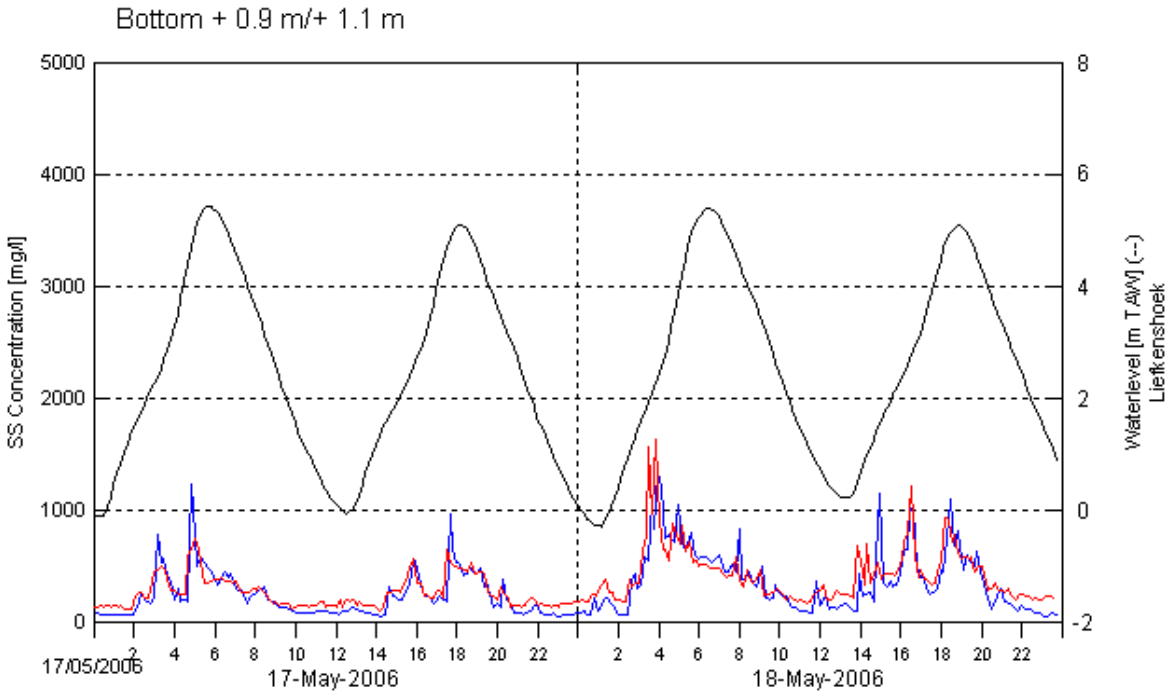
Date: 15/05/06 – 16/05/06

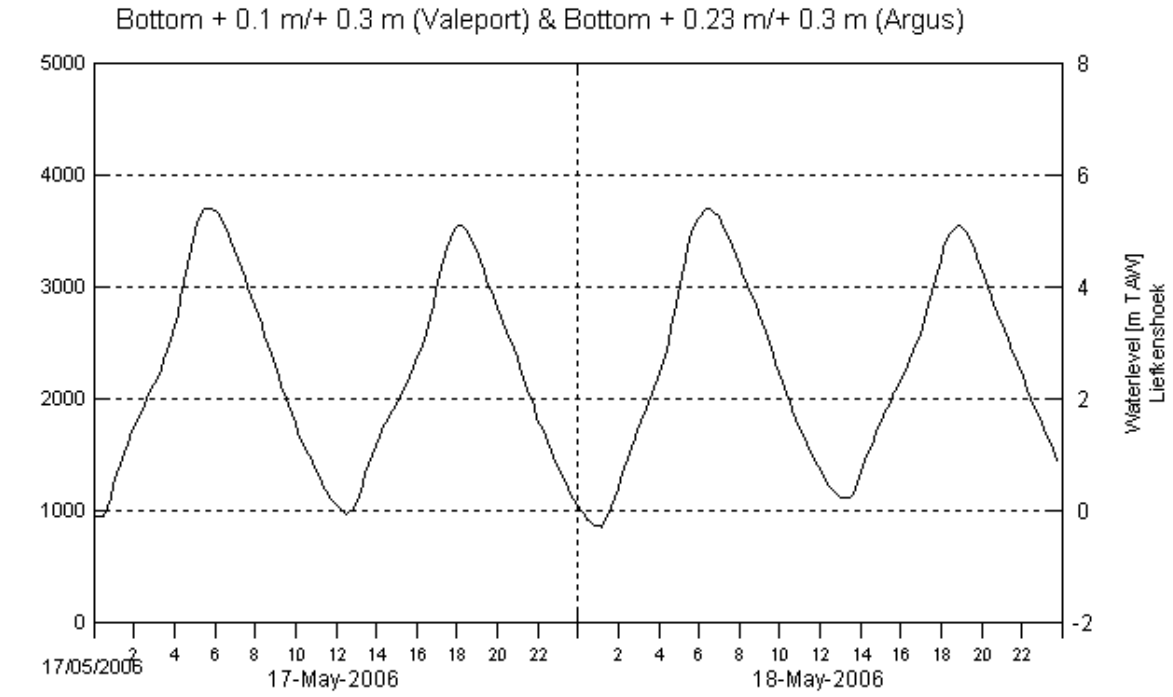
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

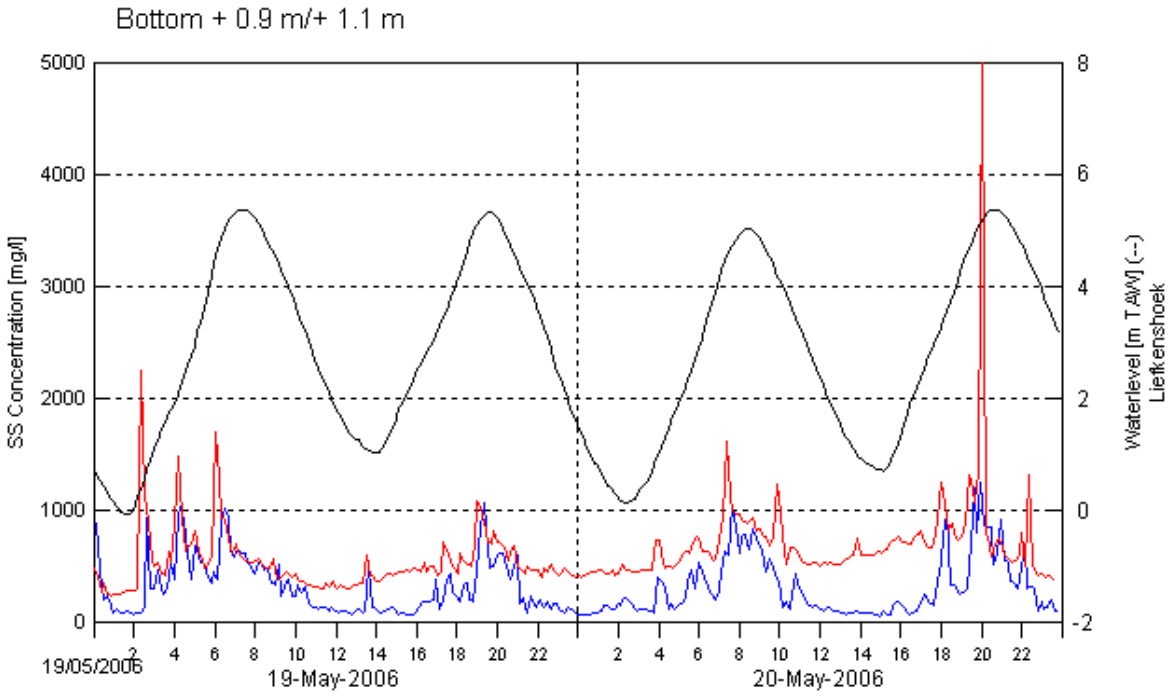
Date: 17/05/06 – 18/05/06

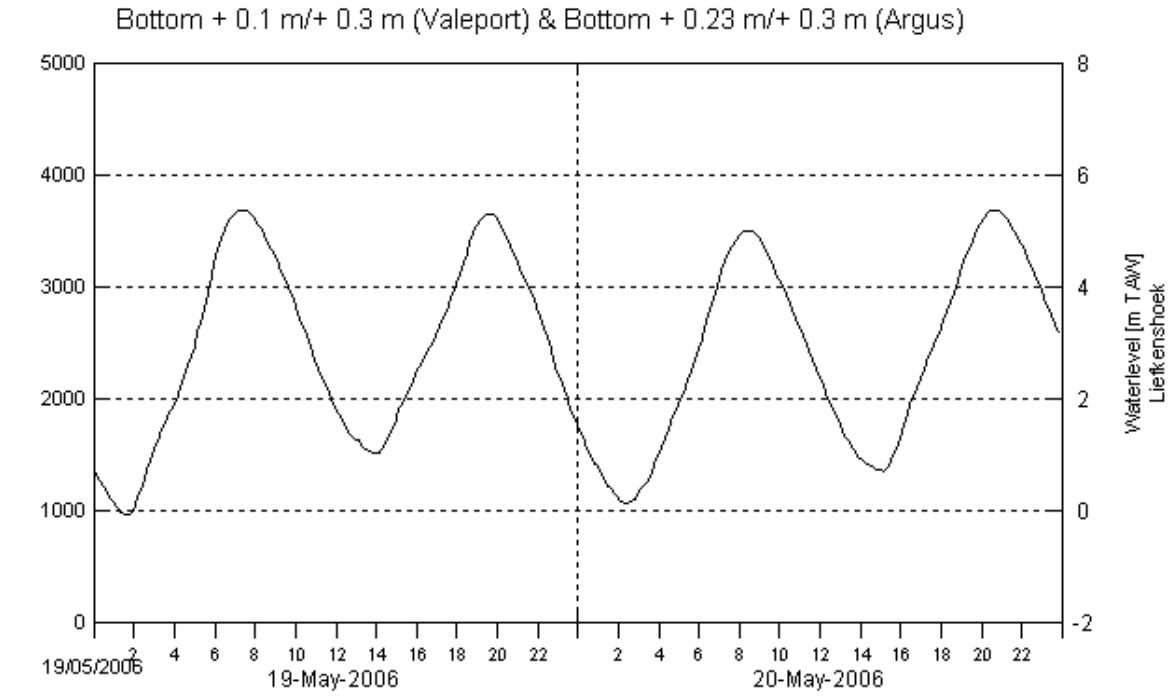
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

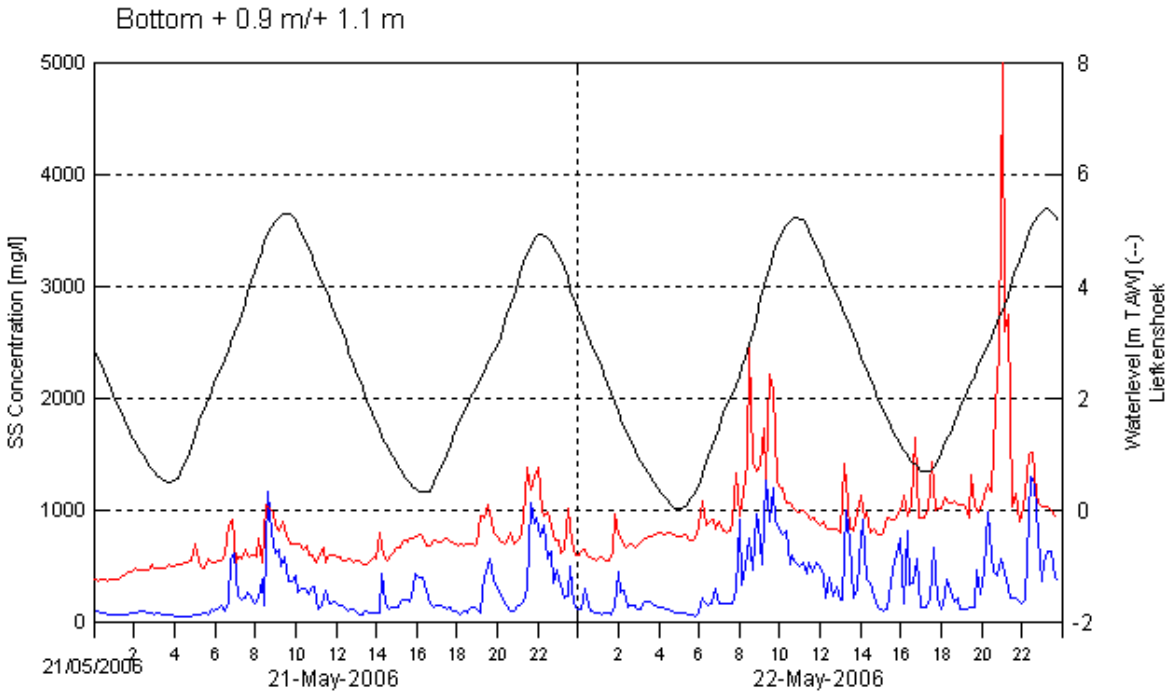
Date: 19/05/06 – 20/05/06

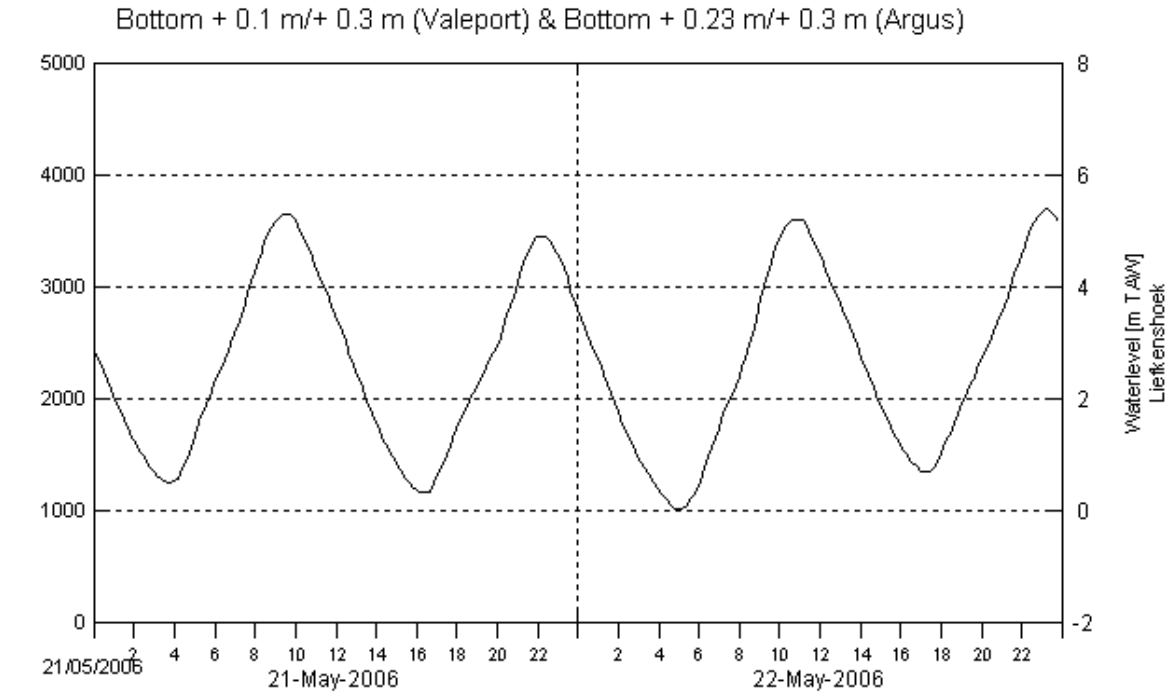
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

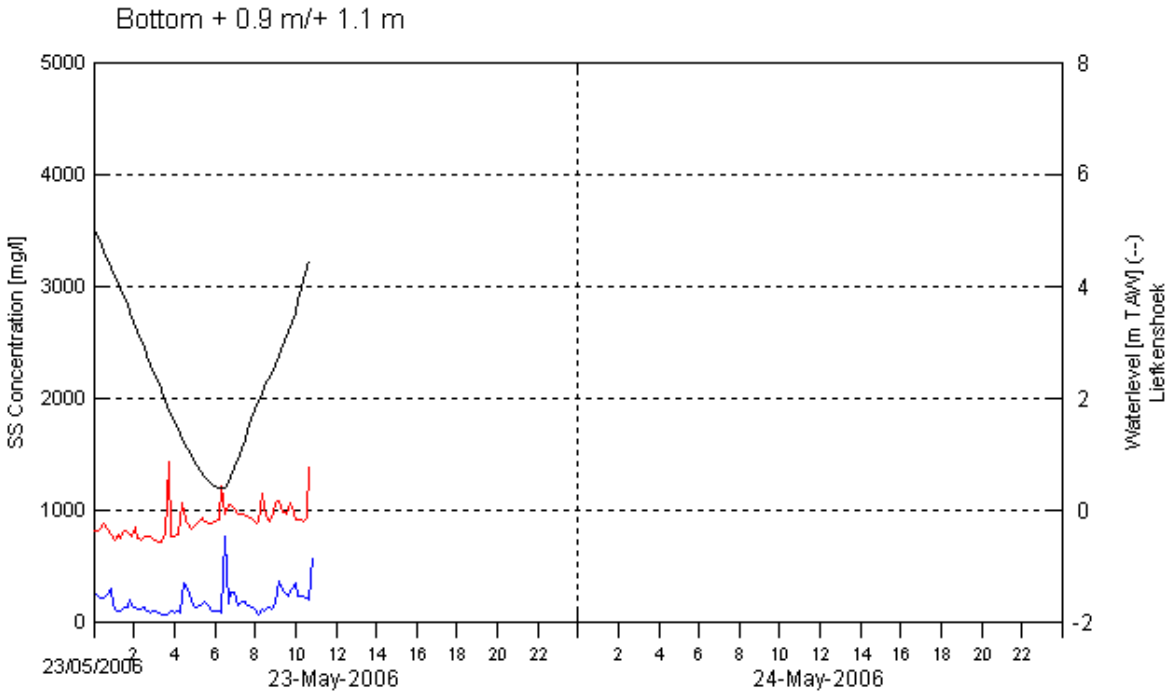
Date: 21/05/06 – 22/05/06

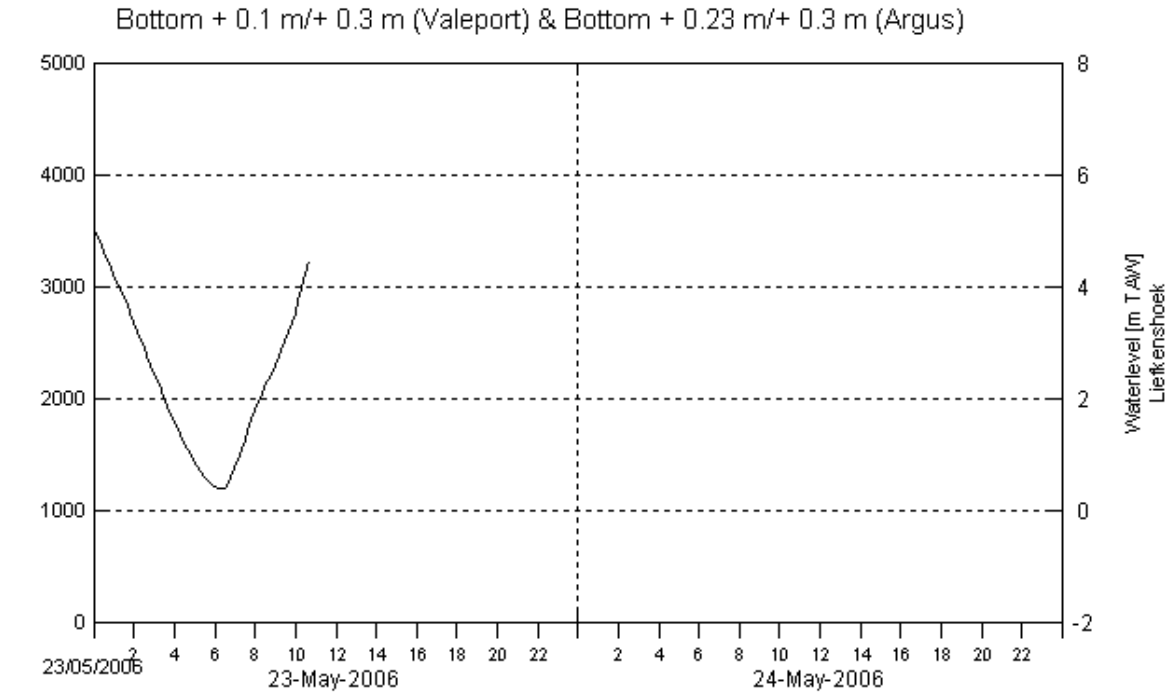
Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 m/1.1 m and 0.1 m/0.3 m above the bottom for SS concentration

Location: Deurganckdok Sill

Date: 23/05/06

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

Comparison of SS concentrations during each tidal phase

Date	Tide No.	Phase	Tidal Diff	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
			[m]	UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060419	1	flood	3.5	221.8	-	137.9	1083
20060420	1	ebb	4.9	150.4	-	92.9	318.9
20060420	2	flood	5	265.9	-	147	389.9
20060420	2	ebb	4.9	112.1	-	67.6	240
20060420	3	flood	4.4	162.8	-	111.9	326
20060421	3	ebb	4.6	98.6	-	63.1	206.6
20060421	4	flood	4.6	227.4	-	150.7	419.8
20060421	4	ebb	4.3	106.3	-	58.4	175.8
20060421	5	flood	4	131.6	-	76.3	233.1
20060422	5	ebb	4.2	89	-	49.2	138.3
20060422	6	flood	4.3	189.5	-	119.1	266.7
20060422	6	ebb	4.2	131.8	-	78.6	187
20060422	7	flood	3.8	148.2	-	98.4	208.5
20060423	7	ebb	4	69.8	-	37.6	104.7
20060423	8	flood	4.8	184.6	-	115.7	237.6
20060423	8	ebb	4.4	80.9	-	40.5	111.6
20060423	9	flood	4.2	137.7	-	86.7	197.7
20060424	9	ebb	4.8	74.7	-	41.5	96.7
20060424	10	flood	5	246.5	-	154.9	255.2
20060424	10	ebb	4.9	124	-	79.2	201.4
20060425	11	flood	4.8	181.8	-	102.2	209.9
20060425	11	ebb	5.3	92.6	-	51	100
20060425	12	flood	5.8	192.7	-	119	213.3
20060425	12	ebb	5.3	101.7	-	54.3	117.4
20060426	13	flood	5.3	257.7	-	173.7	417.1
20060426	13	ebb	5.5	116.2	-	68.3	166.3
20060427	14	flood	5.8	155.5	-	173.7	75.1
20060427	14	ebb	6.1	129.7	-	163.1	851.7
20060427	15	flood	6.2	275.2	-	263.8	758.7
20060427	15	ebb	5.9	161.3	-	185.5	852.8
20060428	16	flood	5.8	218.5	-	231.4	945.9
20060428	16	ebb	6.1	155.8	-	174.9	792
20060428	17	flood	6.4	290	-	267.5	761.3
20060428	17	ebb	6	292.9	-	347.7	464
20060429	18	flood	5.9	330.5	-	309	1151.2
20060429	18	ebb	6.2	160.7	-	186.2	520.2
20060429	19	flood	6.1	263	-	238	432.8
20060429	19	ebb	6	134.3	-	169.4	255.3
20060430	20	flood	5.9	193	-	210.2	420.5
20060430	20	ebb	6.1	124.5	-	155.8	240.3
20060430	21	flood	5.9	135.8	-	165.8	268.4
20060501	21	ebb	5.9	125.2	-	163.1	228.4

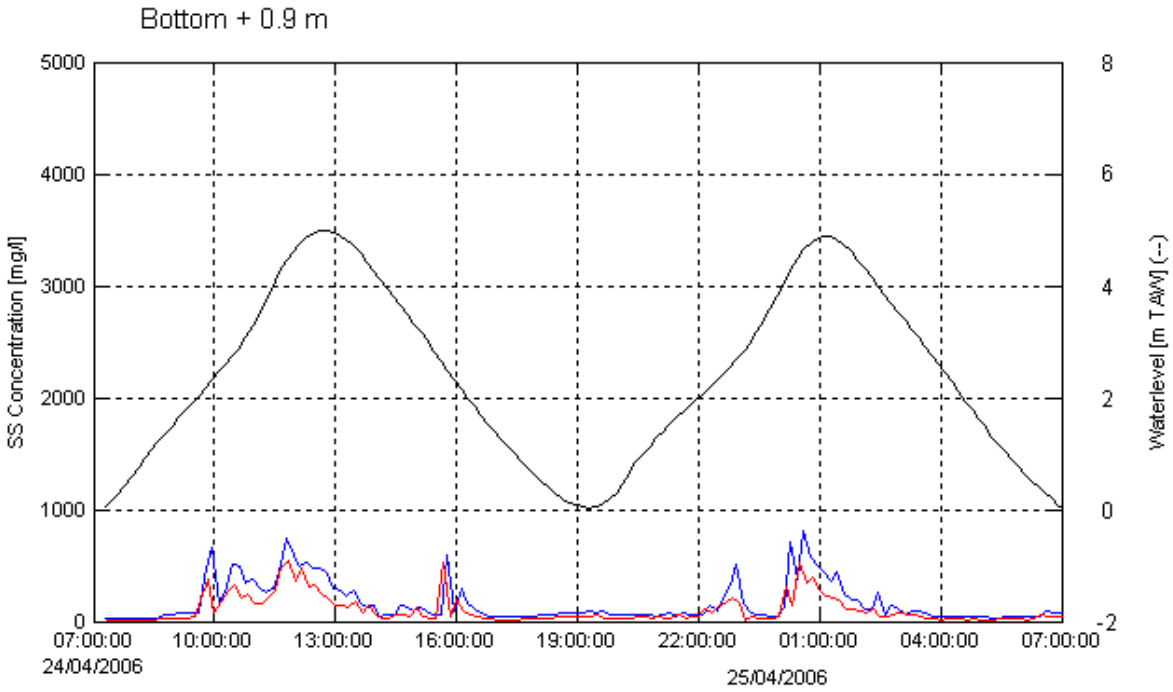
Comparison of SS concentrations during each tidal phase

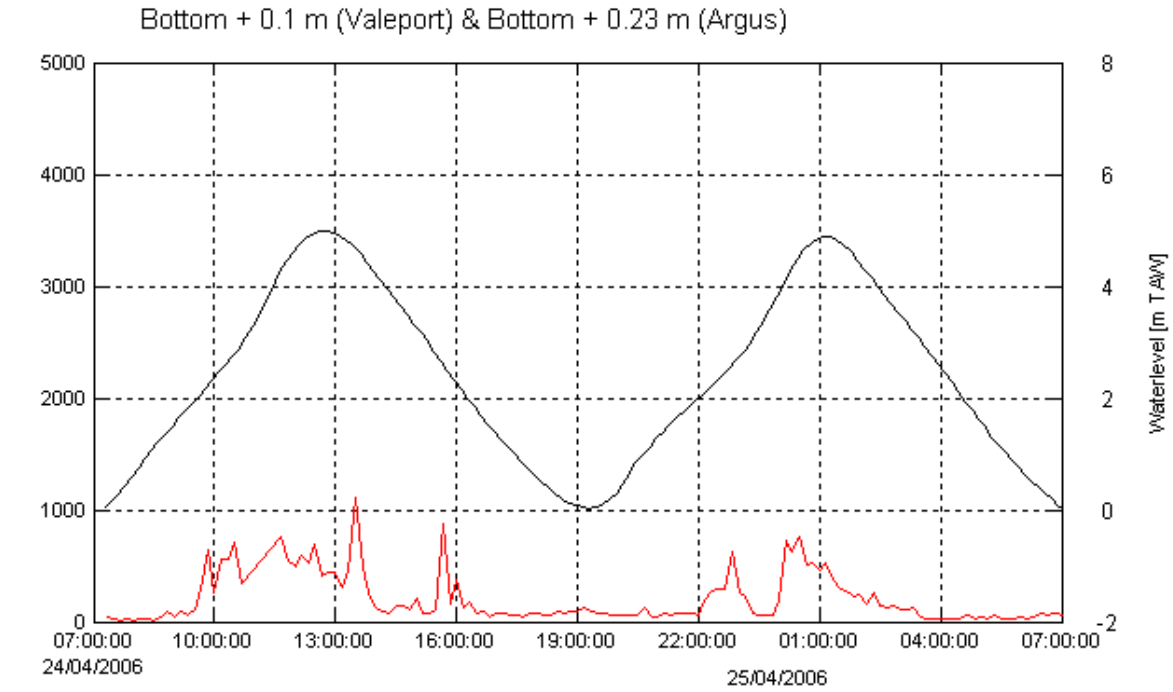
Date	Tide No.	Phase	Tidal Diff	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
			[m]	UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060501	22	flood	5.8	173.2	-	173.8	710.1
20060501	22	ebb	5.8	125.5	-	155	216.7
20060501	23	flood	5.6	226.4	-	233	330.1
20060502	23	ebb	5.4	148.7	-	162.6	175.2
20060502	24	flood	5.6	168.9	-	177.9	379.8
20060502	24	ebb	5.3	156.2	-	171.1	191.5
20060502	25	flood	5	253.9	-	227	312.2
20060503	25	ebb	5.4	182.3	-	198.2	314.7
20060503	26	flood	5.2	420.4	-	396.5	1005.4
20060503	26	ebb	4.8	188.3	-	216.4	2480.1
20060503	27	flood	4.8	287.3	-	275.6	452.5
20060504	27	ebb	4.9	182.8	-	202.7	426.9
20060504	28	flood	4.9	304.5	-	325.8	-
20060504	28	ebb	4.4	206.4	-	206.7	-
20060504	29	flood	4.1	276.7	-	261.9	-
20060505	29	ebb	4.4	210.4	-	224.9	-
20060505	30	flood	4.4	418.6	-	380.1	-
20060505	30	ebb	4	330.9	-	311.2	-
20060505	31	flood	3.7	329.7	-	320.1	-
20060506	31	ebb	3.8	166.4	-	196.6	-
20060506	32	flood	4.1	308.7	-	278.8	-
20060506	32	ebb	3.9	105.9	-	150.3	-
20060506	33	flood	3.5	134.7	-	165.1	-
20060507	33	ebb	3.8	87.2	-	136.2	-
20060507	34	flood	4.1	195.6	-	217.2	-
20060507	34	ebb	3.9	89.6	-	134.8	-
20060507	35	flood	3.7	128.9	-	153.5	-
20060508	35	ebb	4.2	82.6	-	126.8	-
20060508	36	flood	4.5	189.4	-	207.3	-
20060508	36	ebb	4.3	112.5	-	146.8	-
20060509	37	flood	4.3	165.4	-	195.2	-
20060509	37	ebb	4.4	101	-	144.2	-
20060509	38	flood	4.8	209	-	220	-
20060509	38	ebb	4.6	98.6	-	161.8	-
20060510	39	flood	4.5	199.1	-	240.1	-
20060510	39	ebb	5	91.6	-	169.2	-
20060511	40	flood	5.1	165.9	-	223.1	-
20060511	40	ebb	5.2	133.9	-	200.1	-
20060511	41	flood	5.3	289.9	-	321	-
20060511	41	ebb	5.3	182.5	-	233.1	-
20060512	42	flood	5.2	244.3	-	294.7	-
20060512	42	ebb	5.4	163.1	-	224.6	-
20060512	43	flood	5.5	425.1	-	436.3	-

Comparison of SS concentrations during each tidal phase

Date	Tide No.	Phase	Tidal Diff [m]	OBS SS Concentration [mg/l]		Argus SS Concentration [mg/l]	
				UP (RCM9)	DOWN (Valeport)	UP	DOWN
20060512	43	ebb	5.5	168.6	-	236.6	-
20060513	44	flood	5.5	368.9	-	415	-
20060513	44	ebb	5.5	161	-	216.3	-
20060513	45	flood	5.7	313.6	-	357.9	-
20060513	45	ebb	5.5	161.3	-	227	-
20060514	46	flood	5.4	256	-	296	-
20060514	46	ebb	5.6	209.1	-	267.9	-
20060514	47	flood	5.6	230	-	260.5	-
20060514	47	ebb	5.7	151.8	-	191.9	-
20060515	48	flood	5.5	216.6	-	222.7	-
20060515	48	ebb	5.6	206.6	-	237.9	-
20060515	49	flood	5.2	199.2	-	230.8	-
20060515	49	ebb	5.5	294.6	-	289.2	-
20060516	50	flood	5.6	242.8	-	268.7	-
20060516	50	ebb	5.5	170.3	-	195.5	-
20060516	51	flood	5.4	278.3	-	283.5	-
20060517	51	ebb	5.5	138.6	-	177.5	-
20060517	52	flood	5.5	295.8	-	300.7	-
20060517	52	ebb	5.5	189.4	-	223.7	-
20060517	53	flood	5.1	245.9	-	275.9	-
20060518	53	ebb	5.4	163.8	-	232.3	-
20060518	54	flood	5.6	549.7	-	585.2	-
20060518	54	ebb	5.1	292.1	-	307.9	-
20060518	55	flood	4.9	449.5	-	504.5	-
20060519	55	ebb	5.1	215.7	-	305.4	-
20060519	56	flood	5.4	488.1	-	731.9	-
20060519	56	ebb	4.3	262.5	-	405.6	-
20060519	57	flood	4.3	250.3	-	527.6	-
20060520	57	ebb	5.2	204.4	-	488.9	-
20060520	58	flood	4.9	336.9	-	657.8	-
20060520	58	ebb	4.3	234.8	-	649	-
20060520	59	flood	4.6	401	-	956.2	-
20060521	59	ebb	4.9	188.6	-	489	-
20060521	60	flood	4.8	255.7	-	638.6	-
20060521	60	ebb	5	198.6	-	623.8	-
20060521	61	flood	4.6	263.9	-	819.9	-
20060522	61	ebb	4.9	209.8	-	716.8	-
20060522	62	flood	5.2	456.3	-	1131.9	-
20060522	62	ebb	4.5	401.1	-	943.7	-
20060522	63	flood	4.7	377.5	-	1329.4	-
20060523	63	ebb	4.9	163.7	-	838.4	-

11283 Accretion Deurganckdok – Near bed continuous monitoring – Spring 2006





Comparison of RCM9 & Valeport (blue) to Argus sensors (red) at 0.9 and 0.1 m above the bottom for SS concentration

Location:	Date:
Deurganckdok Sill	Avg Tide 24/04 – 25/04

Data processed by: IMDC

In association with: WL | delft hydraulics, GEMS International

I/RA/11283/06.121/MSA

APPENDIX F.

HCBS2 REPORTS WINTER CAMPAIGN

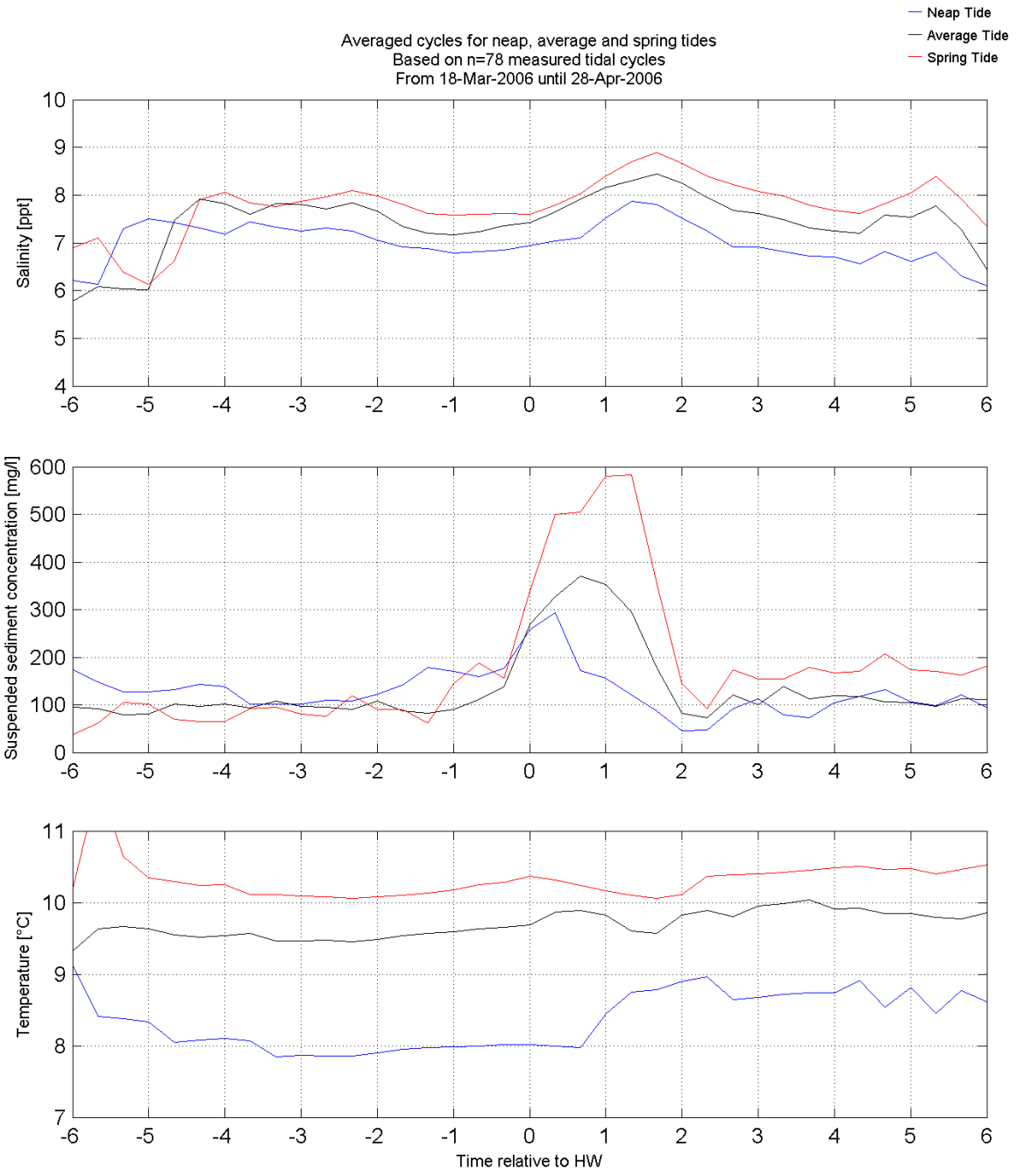
Report	Description
Ambient Conditions Lower Sea Scheldt	
5.3	Overview of ambient conditions in the river Scheldt – January-June 2006 (I/RA/11291/06.088/MSA)
5.4	Overview of ambient conditions in the river Scheldt – July-December 2006 (I/RA/11291/06.089/MSA)
5.5	Overview of ambient conditions in the river Scheldt : RCM-9 buoy 84 & 97 (1/1/2007 -31/3/2007) (I/RA/11291/06.090/MSA)
5.6	Analysis of ambient conditions during 2006 (I/RA/11291/06.091/MSA)
Calibration	
6.1	Winter Calibration (I/RA/11291/06.092/MSA)
6.2	Summer Calibration and Final Report (I/RA/11291/06.093/MSA)
Through tide Measurements Winter 2006	
7.1	21/3 Scheldewacht – Deurganckdok – Salinity Distribution (I/RA/11291/06.094/MSA)
7.2	22/3 Parel 2 – Deurganckdok (I/RA/11291/06.095/MSA)
7.3	22/3 Laure Marie – Liefkenshoek (I/RA/11291/06.096/MSA)
7.4	23/3 Parel 2 – Schelle (I/RA/11291/06.097/MSA)
7.5	23/3 Laure Marie – Deurganckdok (I/RA/11291/06.098/MSA)
7.6	23/3 Veremans Waarde (I/RA/11291/06.099/MSA)
HCBS Near bed continuous monitoring (Frames)	
8.1	Near bed continuous monitoring winter 2006 (I/RA/11291/06.100/MSA)
8.2	Near bed continuous monitoring summer 2006 (I/RA/11291/06.101/MSA)
INSSEV	
9	Settling Velocity - INSSEV summer 2006 (I/RA/11291/06.102/MSA)
Cohesive Sediment	
10	Cohesive sediment properties summer 2006 (I/RA/11291/06.103/MSA)
Through tide Measurements Summer	
11.1	Measurement day 27/9 Vessel 1 (I/RA/11291/06.104/MSA)
11.2	Measurement Day 27/9 vessel 2 (I/RA/11291/06.105/MSA)
11.3	Measurement Day 28/9 vessel 1 (I/RA/11291/06.106/MSA)
11.4	Measurement Day 28/9 vessel 2 (I/RA/11291/06.107/MSA)
11.5	Measurement Day 28/9 vessel 3 (I/RA/11291/06.108/MSA)
Analysis	
12	Report concerning the presence of HCBS layers in the Scheldt river (I/RA/11291/06.109/MSA)

APPENDIX G. AVERAGE TIDAL CYCLES

G.1 Local parameters

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: N-ENTRANCE bottom



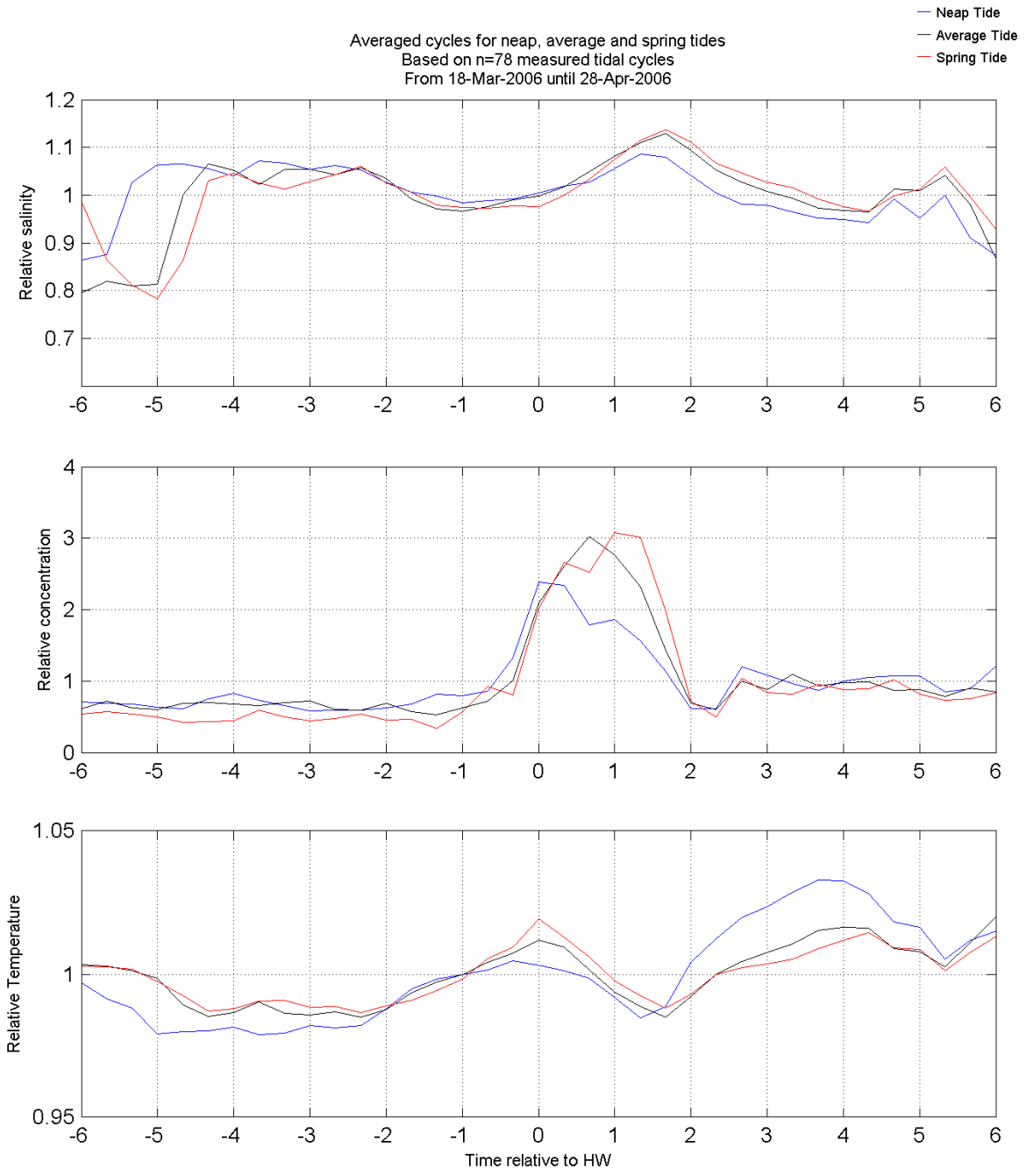
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: N-ENTRANCE bottom



Parameters relative to average over tide

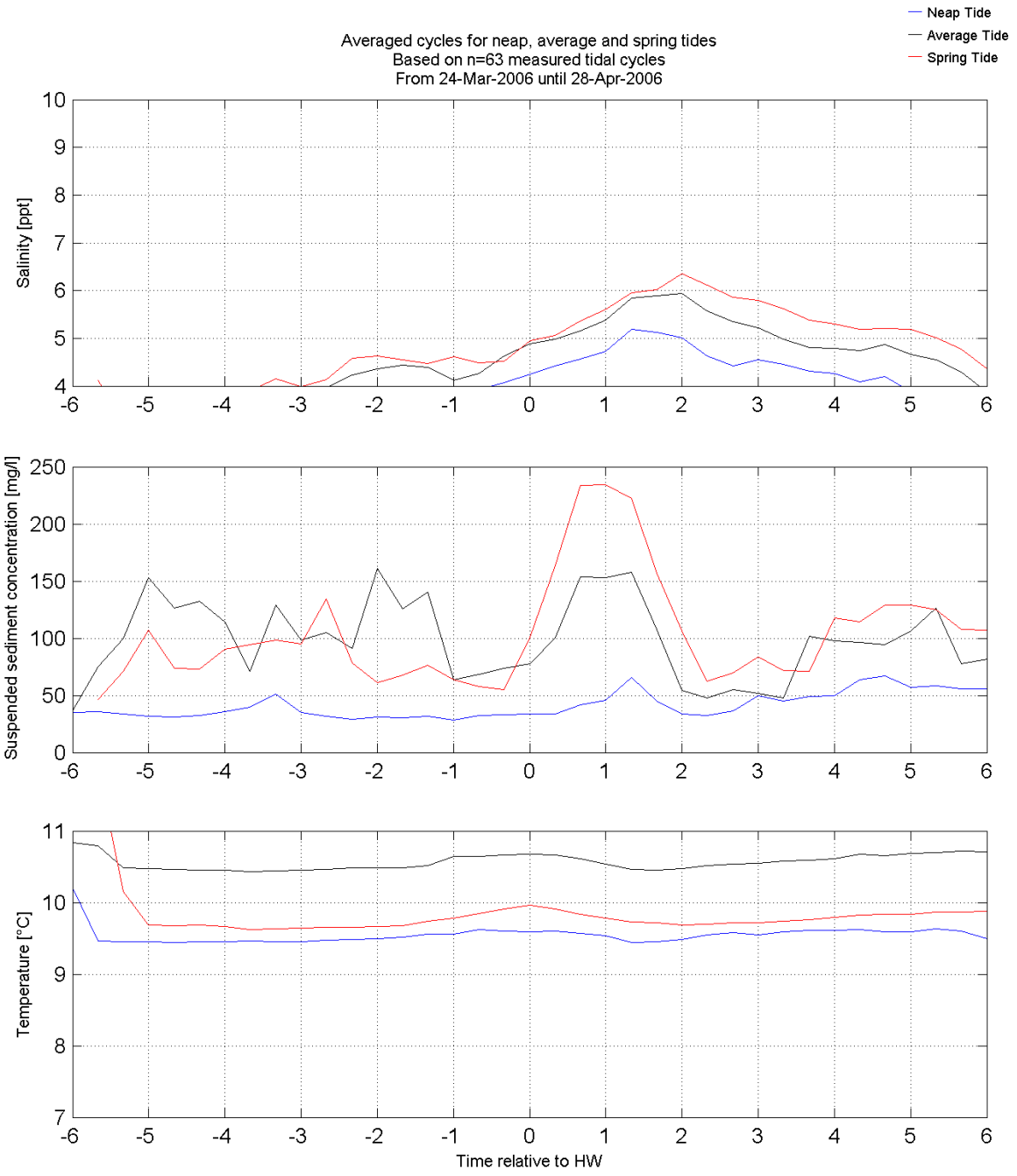
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: N-ENTRANCE top



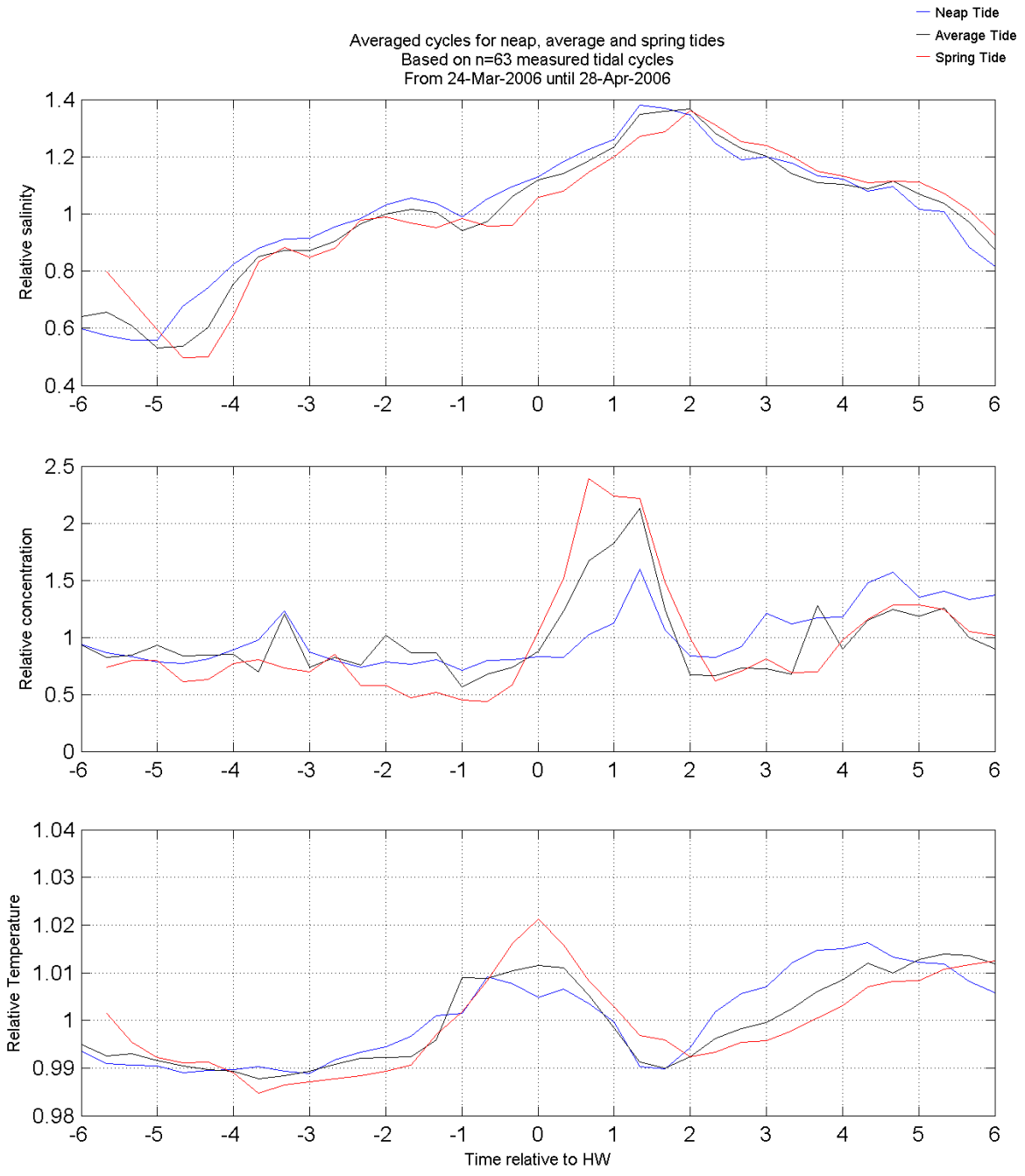
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: N-ENTRANCE top



Parameters relative to average over tide

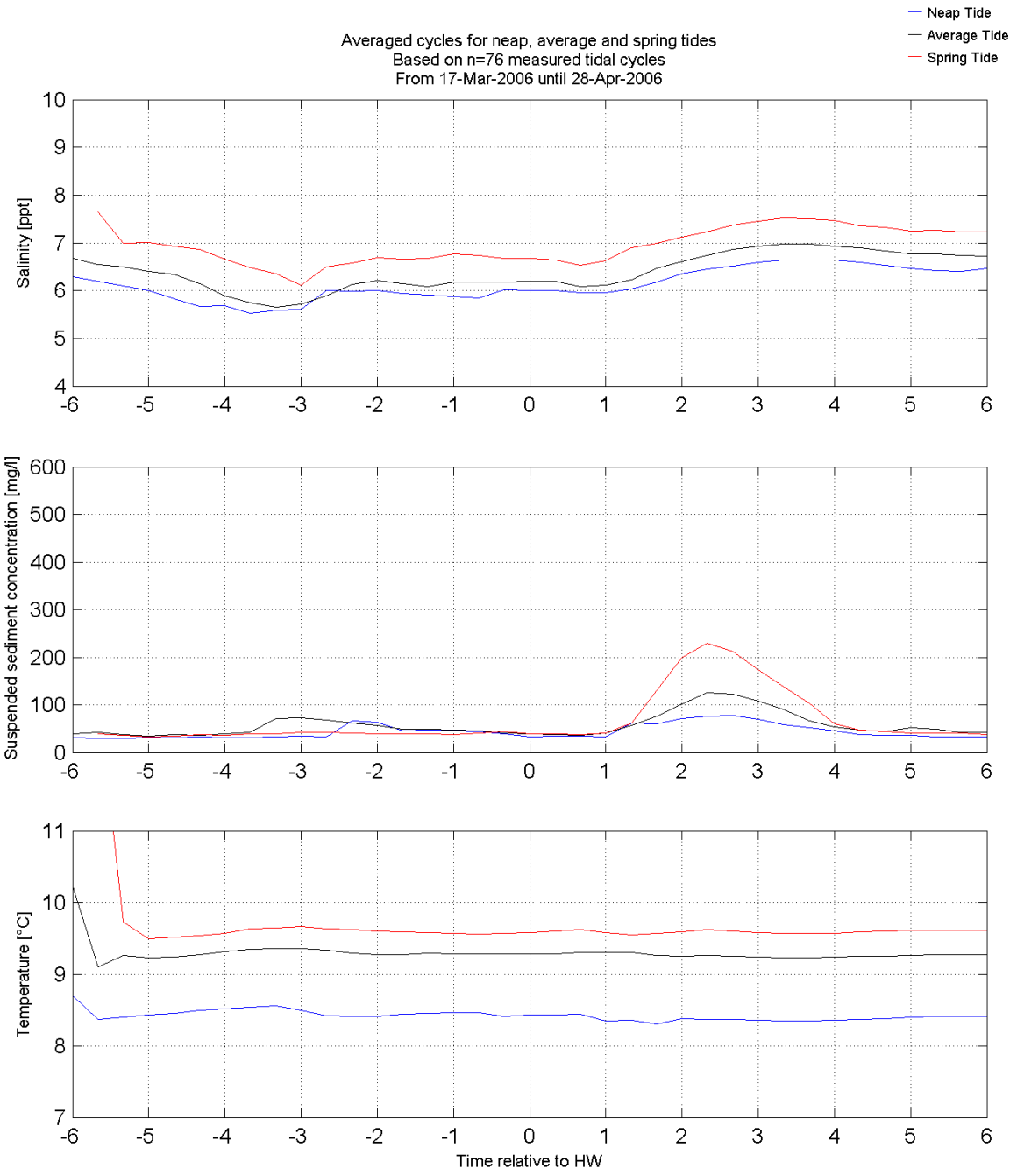
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-BACK bottom



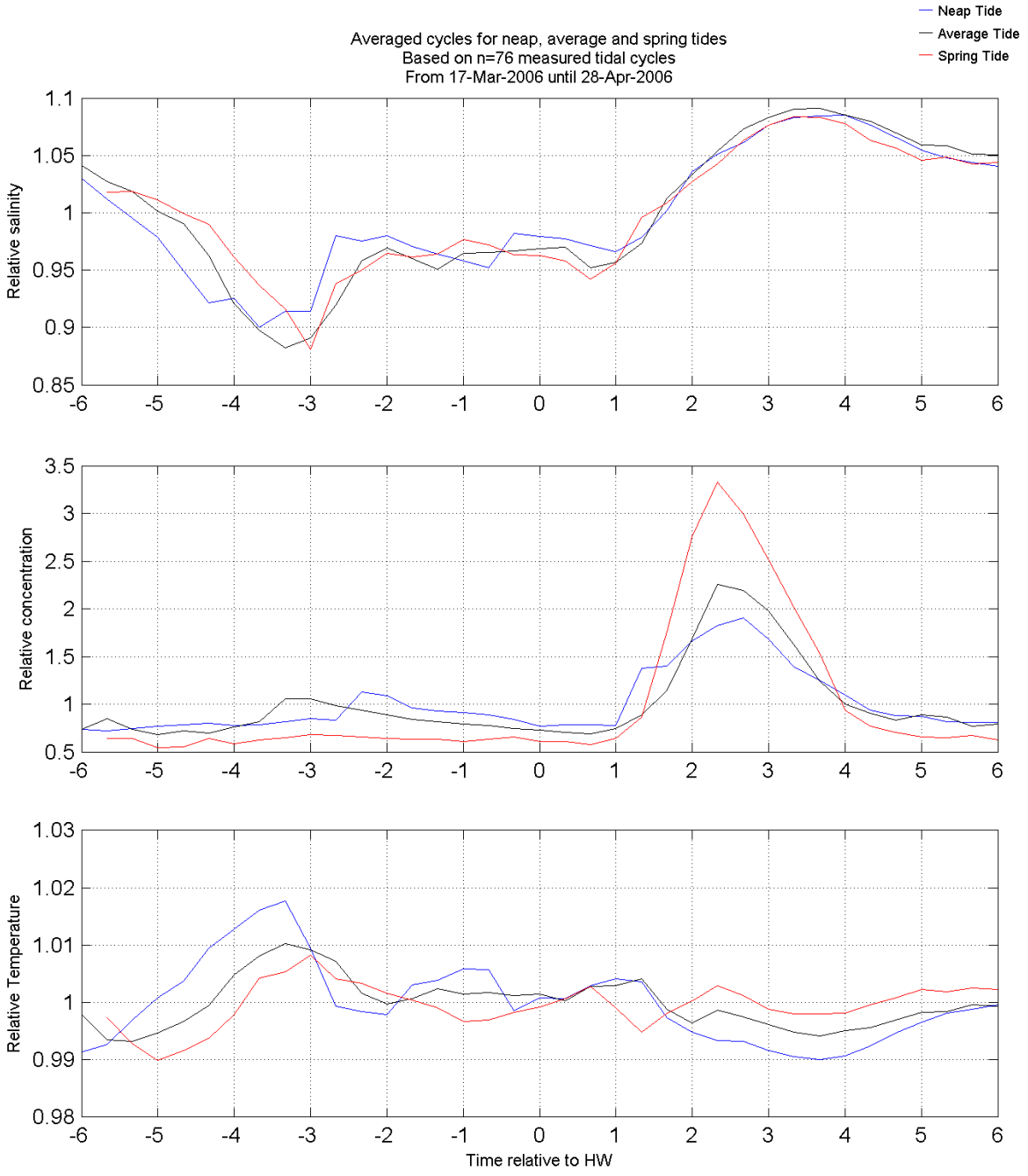
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-BACK bottom



Parameters relative to average over tide

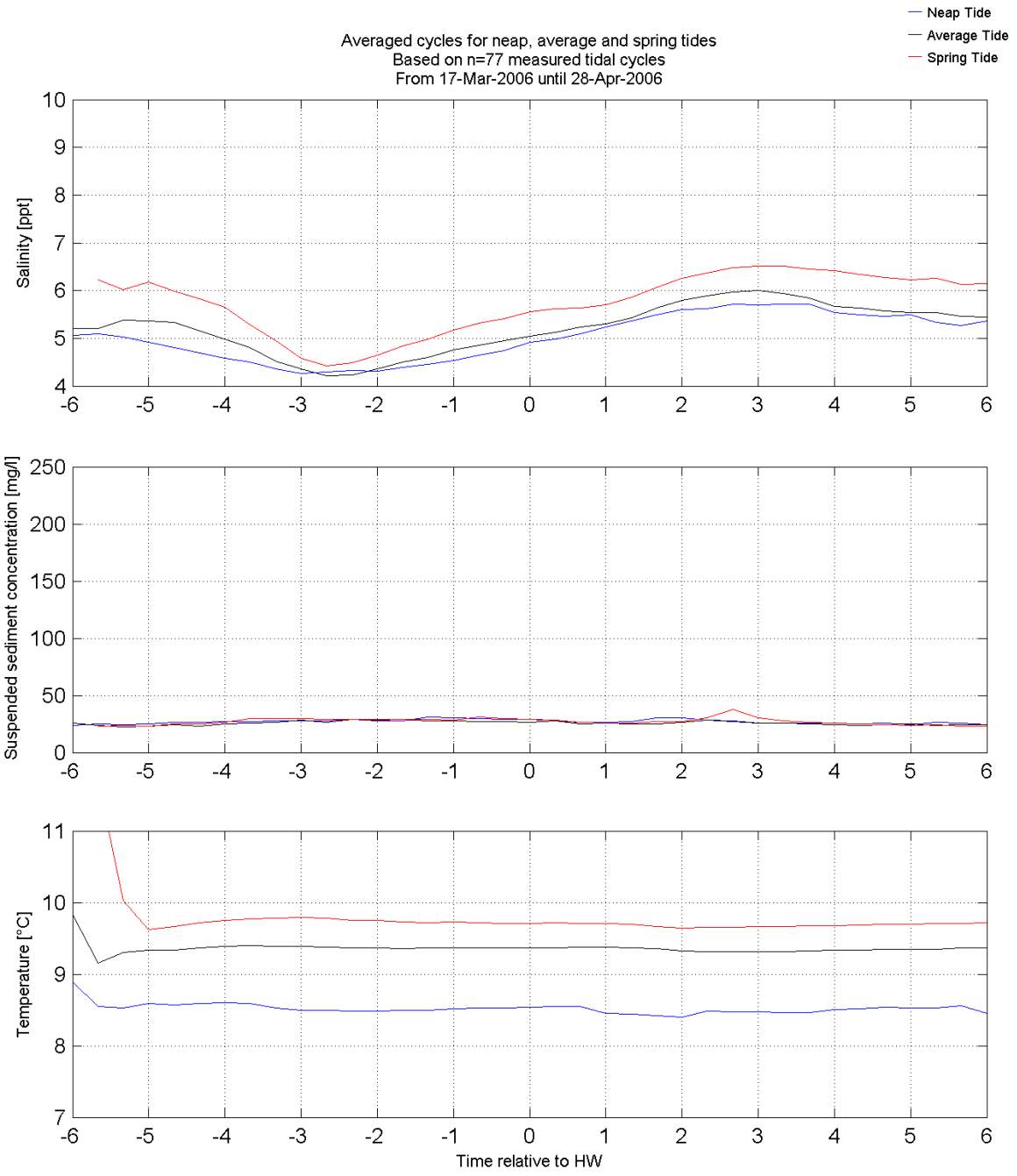
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-BACK top



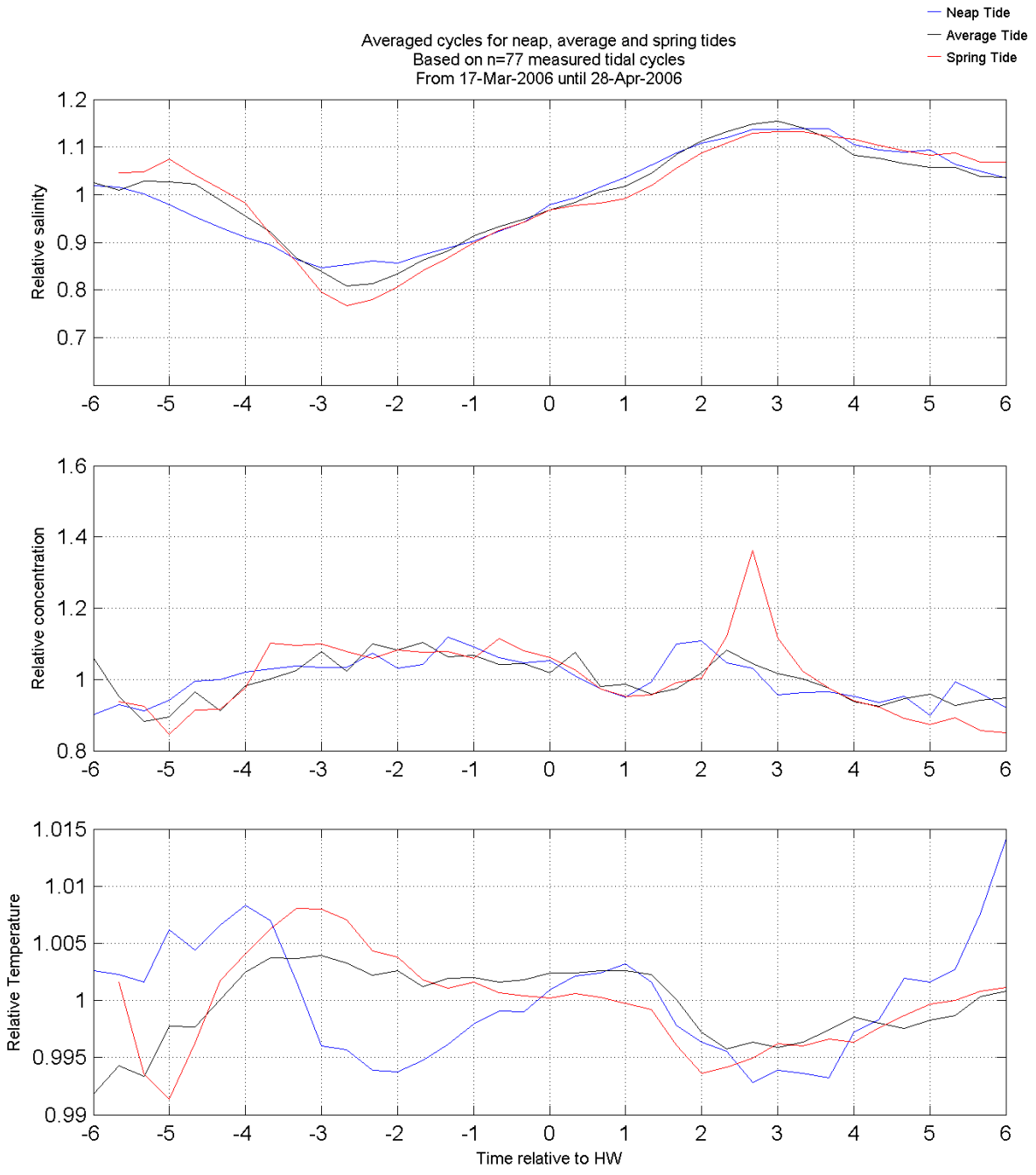
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-BACK top



Parameters relative to average over tide

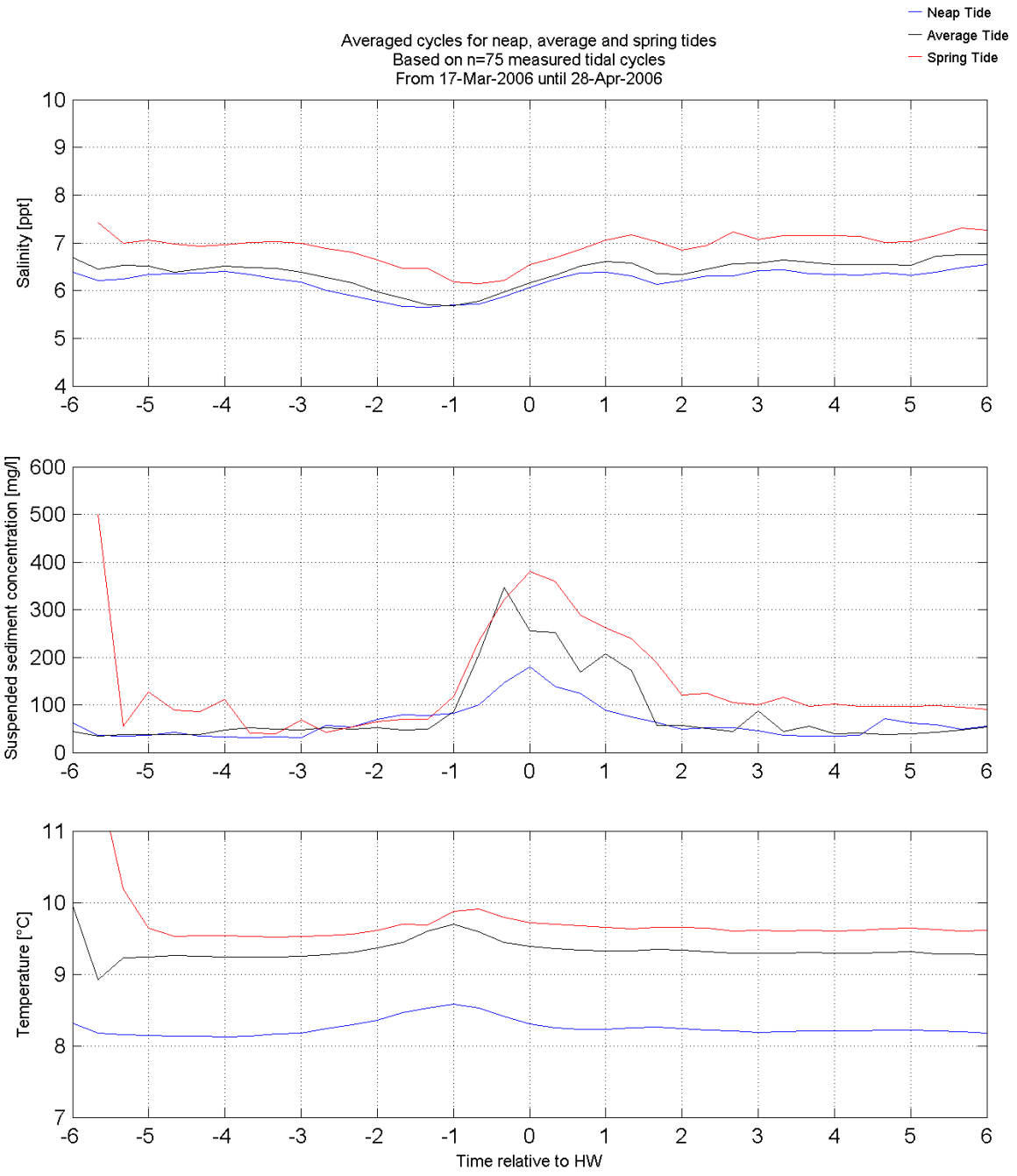
Data Processed by: IMDC

In association with : GEMS International

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-ENTRANCE bottom



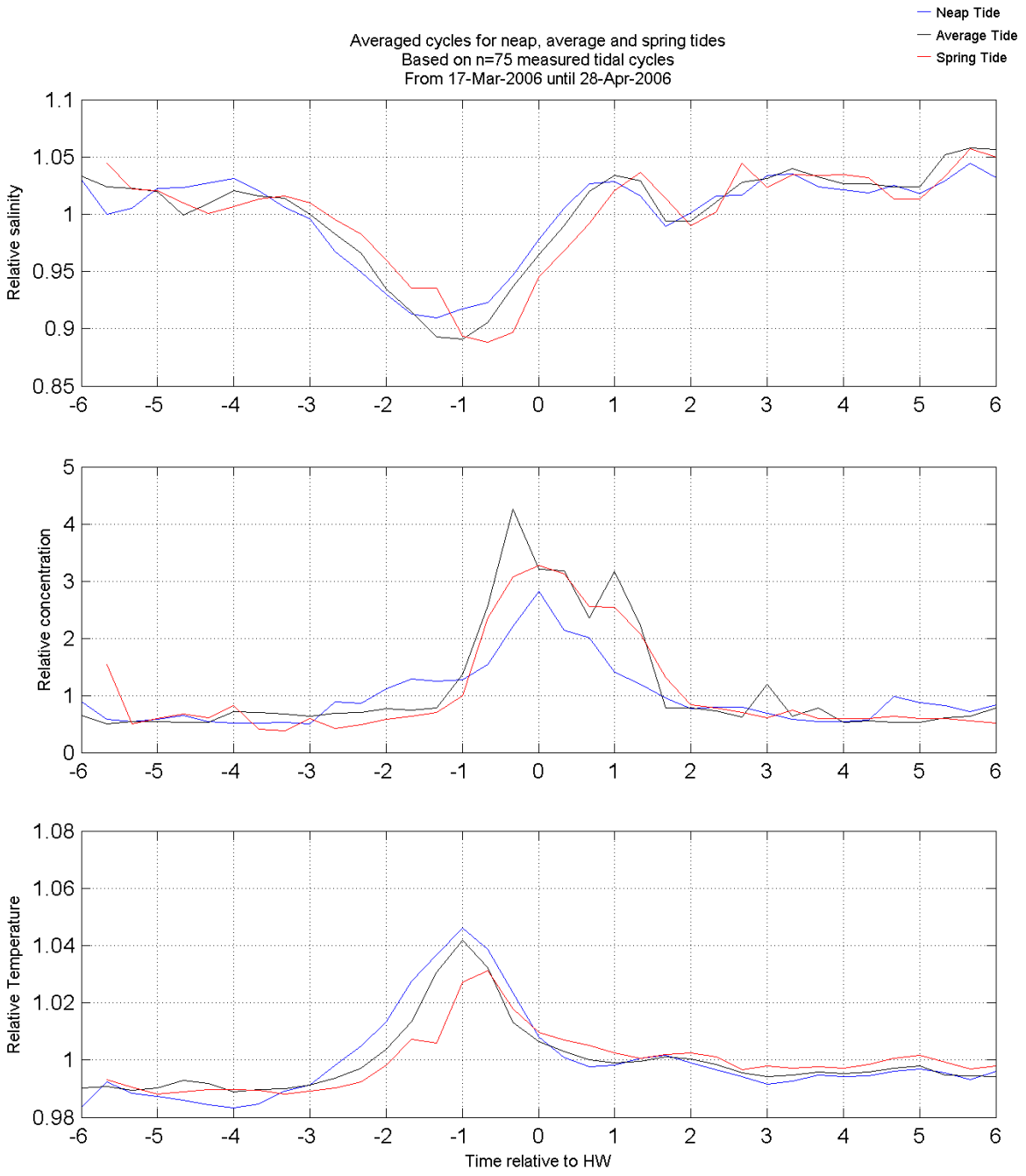
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-ENTRANCE bottom



Parameters relative to average over tide

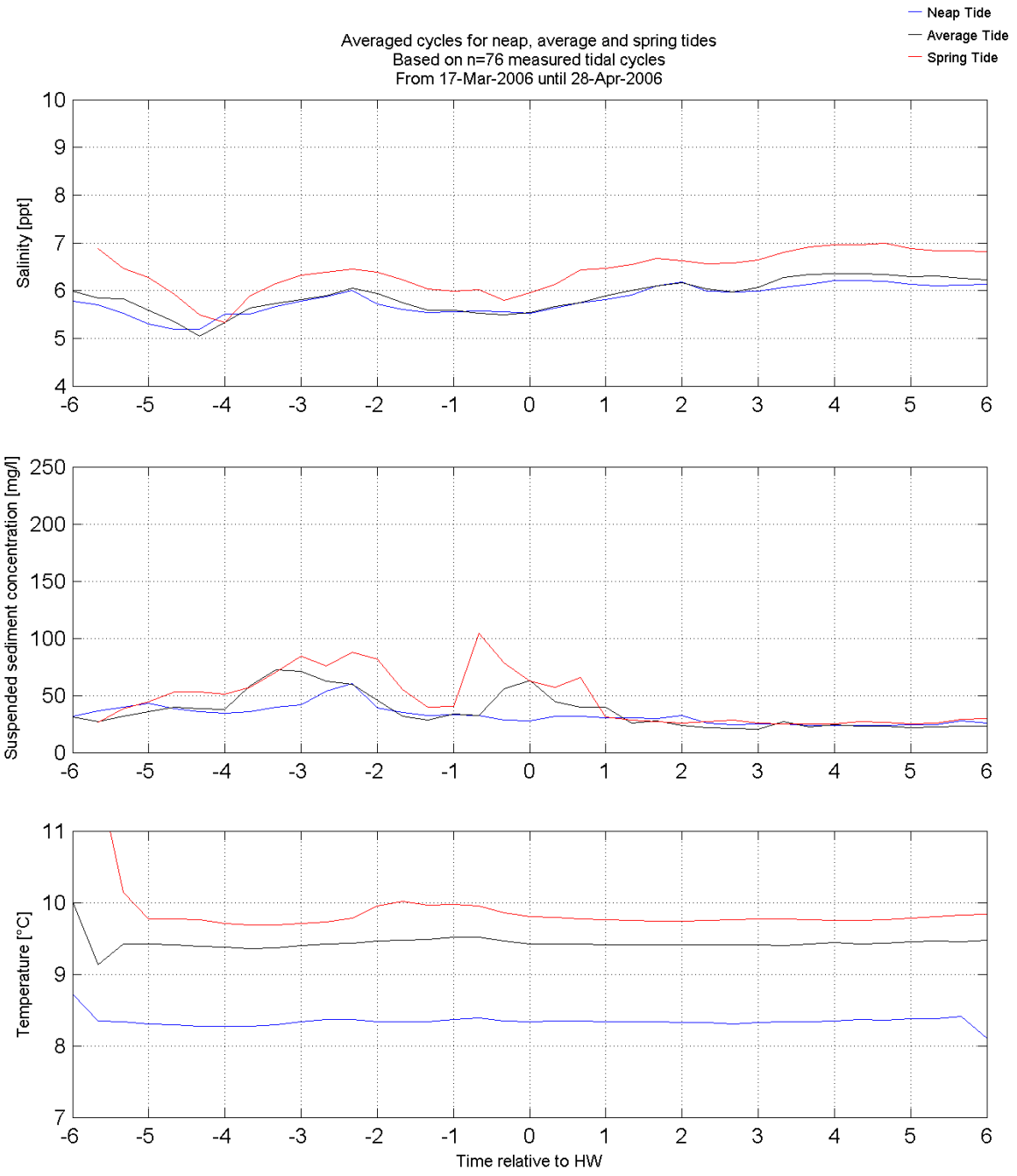
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-ENTRANCE top



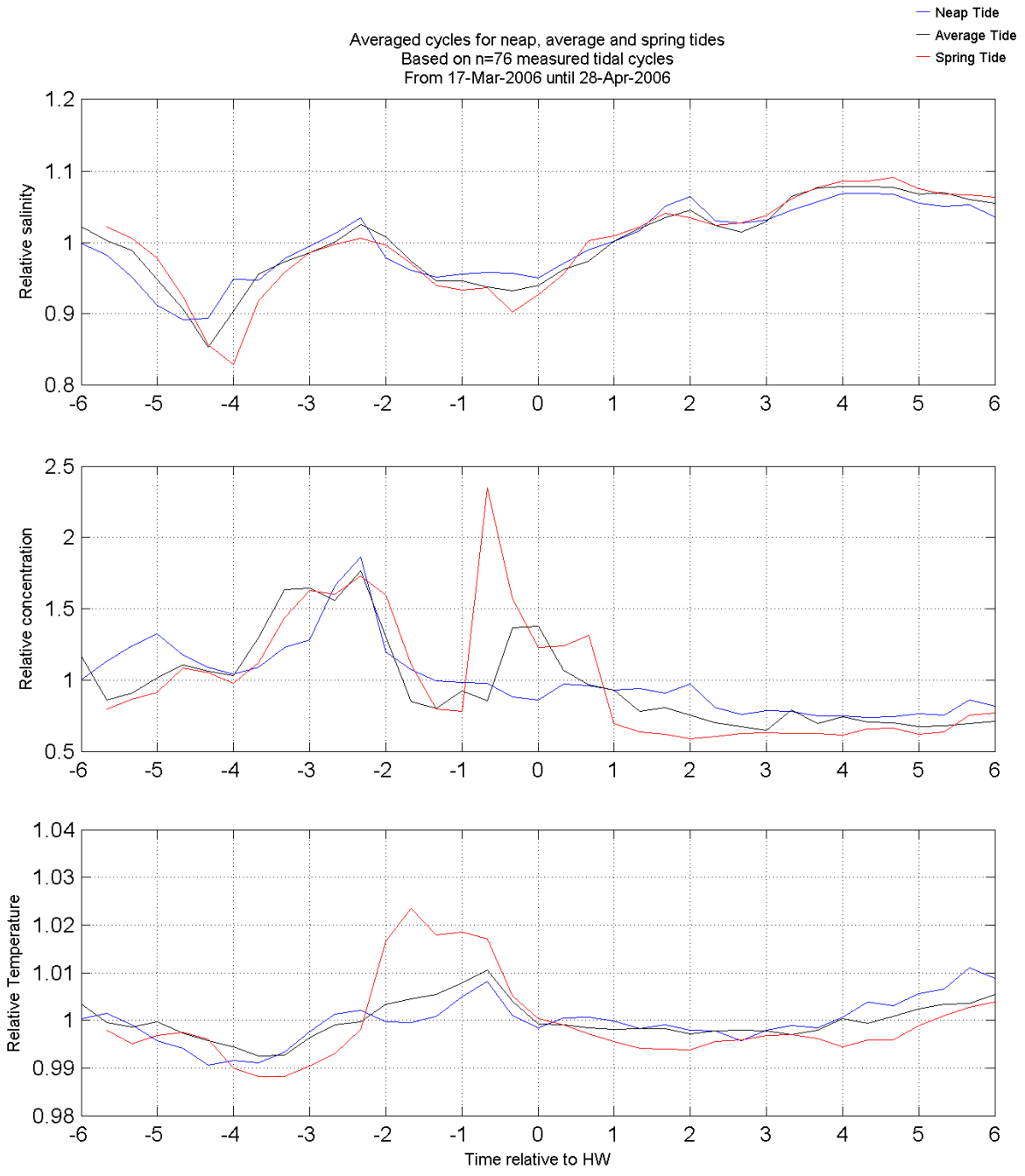
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): OBS-3A
	Location: S-ENTRANCE top



Parameters relative to average over tide

Data Processed by:

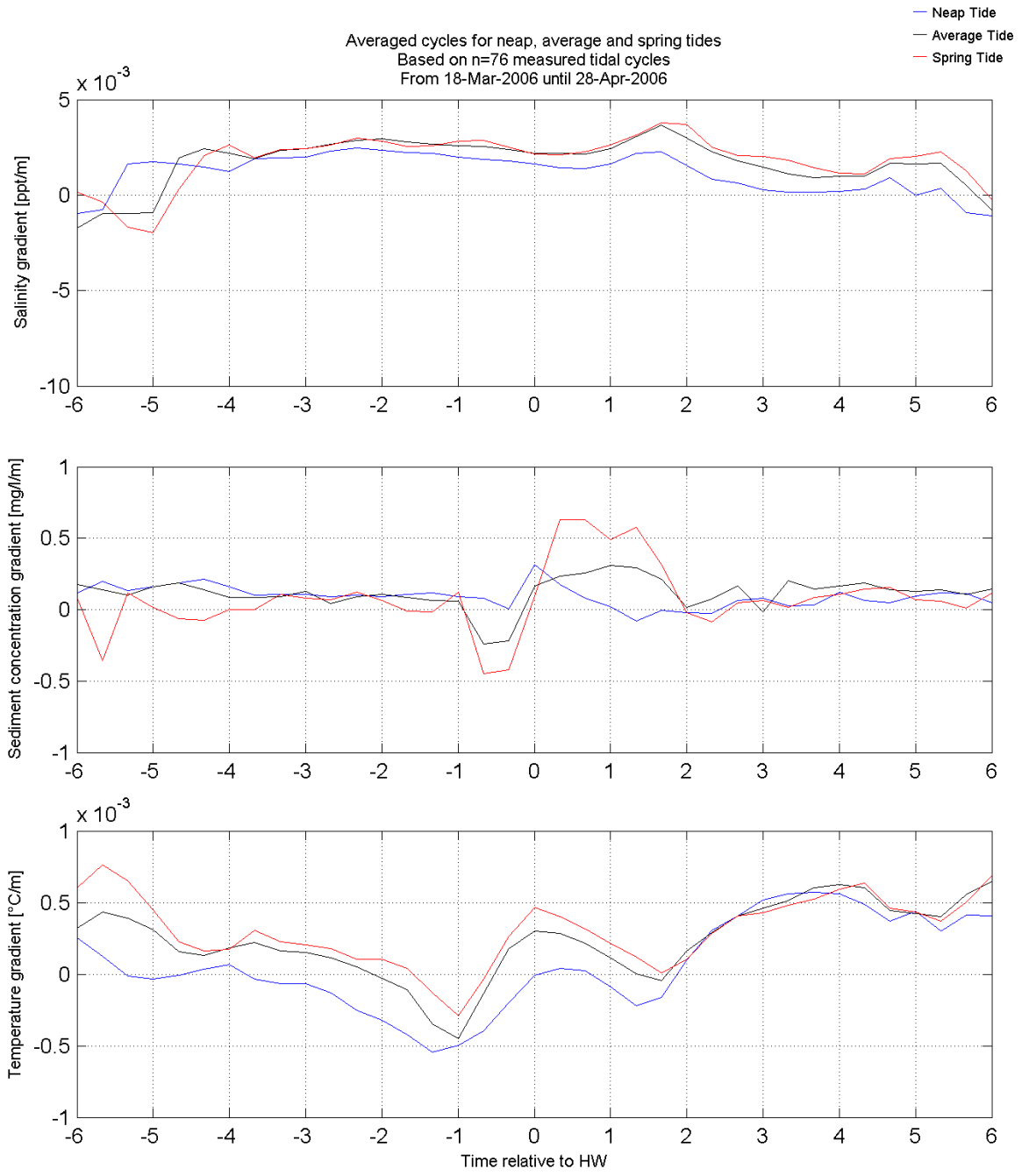
In association with :

I/RA/11283/06.121/MSA

G.2 Along-dock, cross-dock and vertical gradients

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-entrance



Horizontal gradient at -14m TAW =(N-ENTRANCE - S-ENTRANCE)/Δx

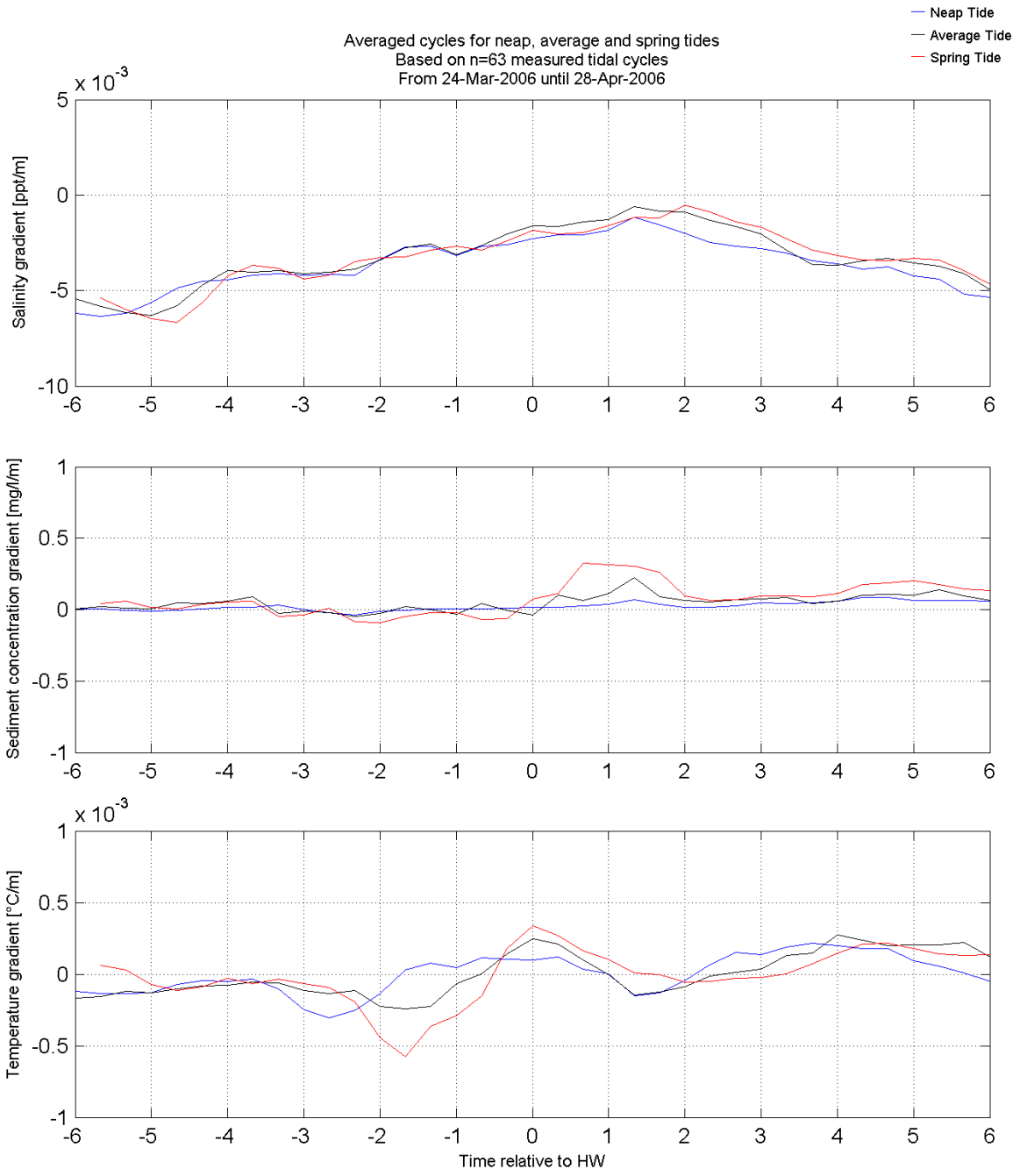
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-entrance



Horizontal gradient at -2m TAW =(N-ENTRANCE - S-ENTRANCE)/Δx

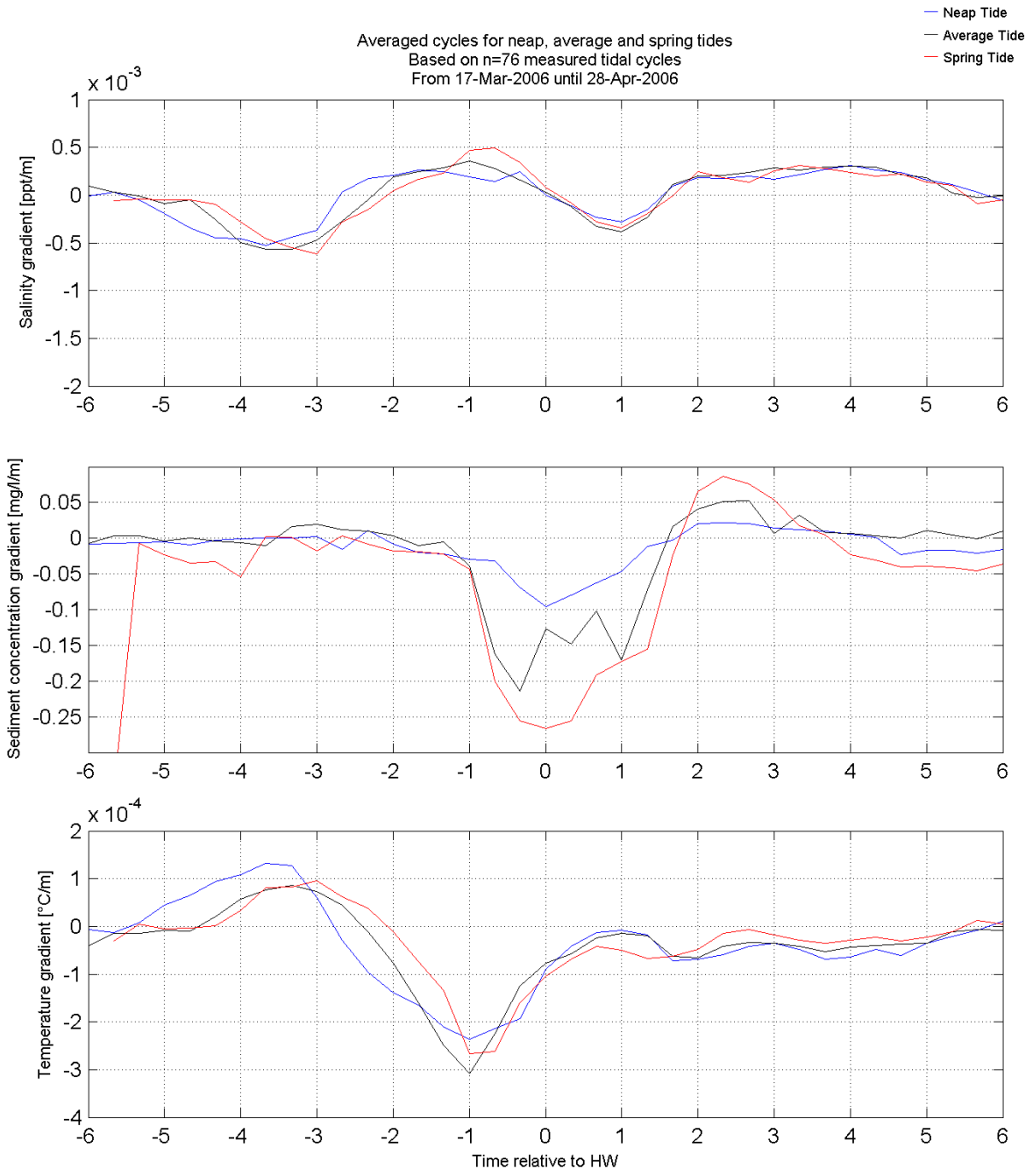
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-P&O



Horizontal gradient at -14m TAW =(S-BACK - S-ENTRANCE)/Δx

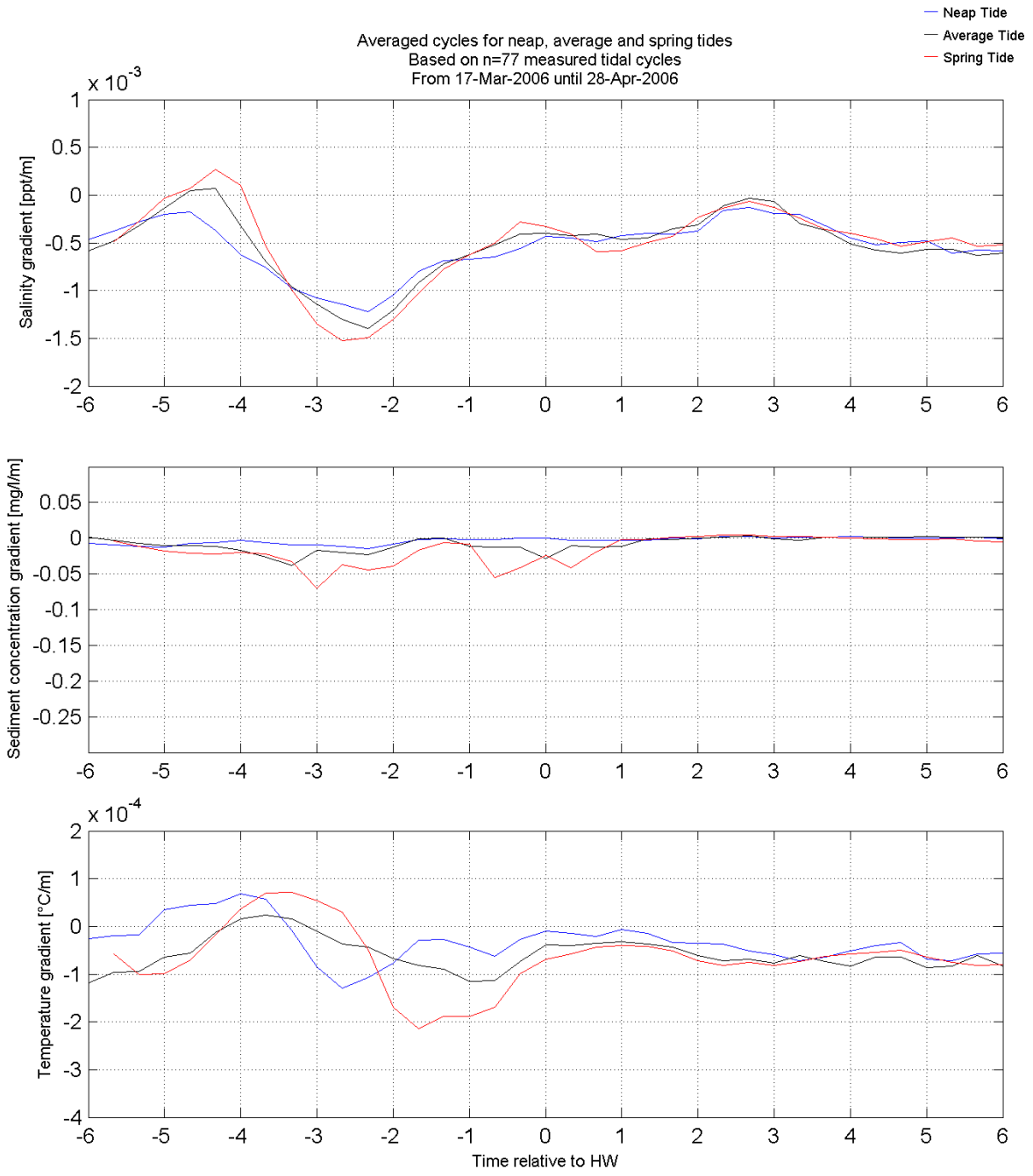
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-P&O



Horizontal gradient at -2m TAW =(S-BACK - S-ENTRANCE)/Δx

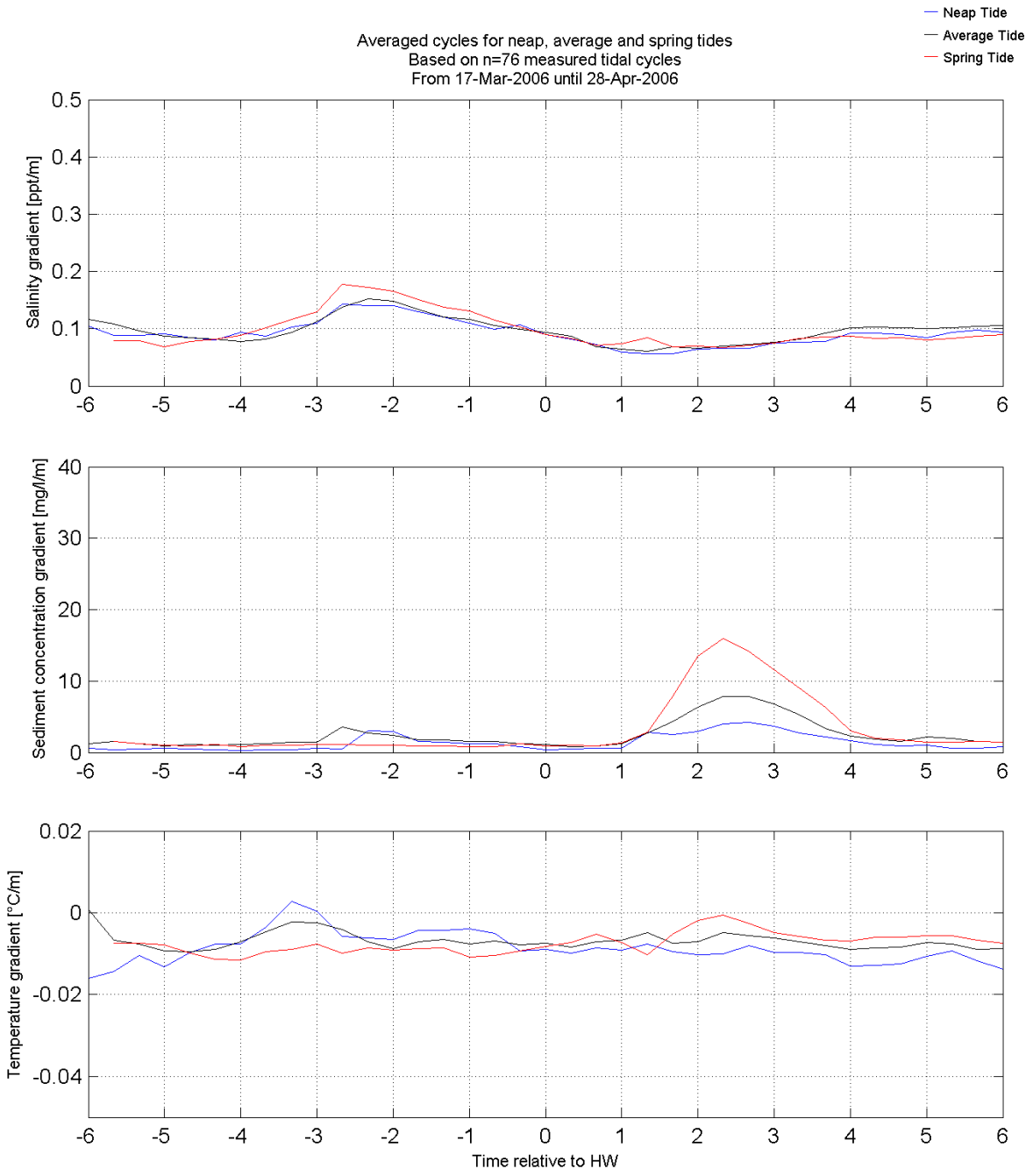
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-P&O1



Vertical gradient at S-BACK =(data(-14m) - data(-2m))/Δz

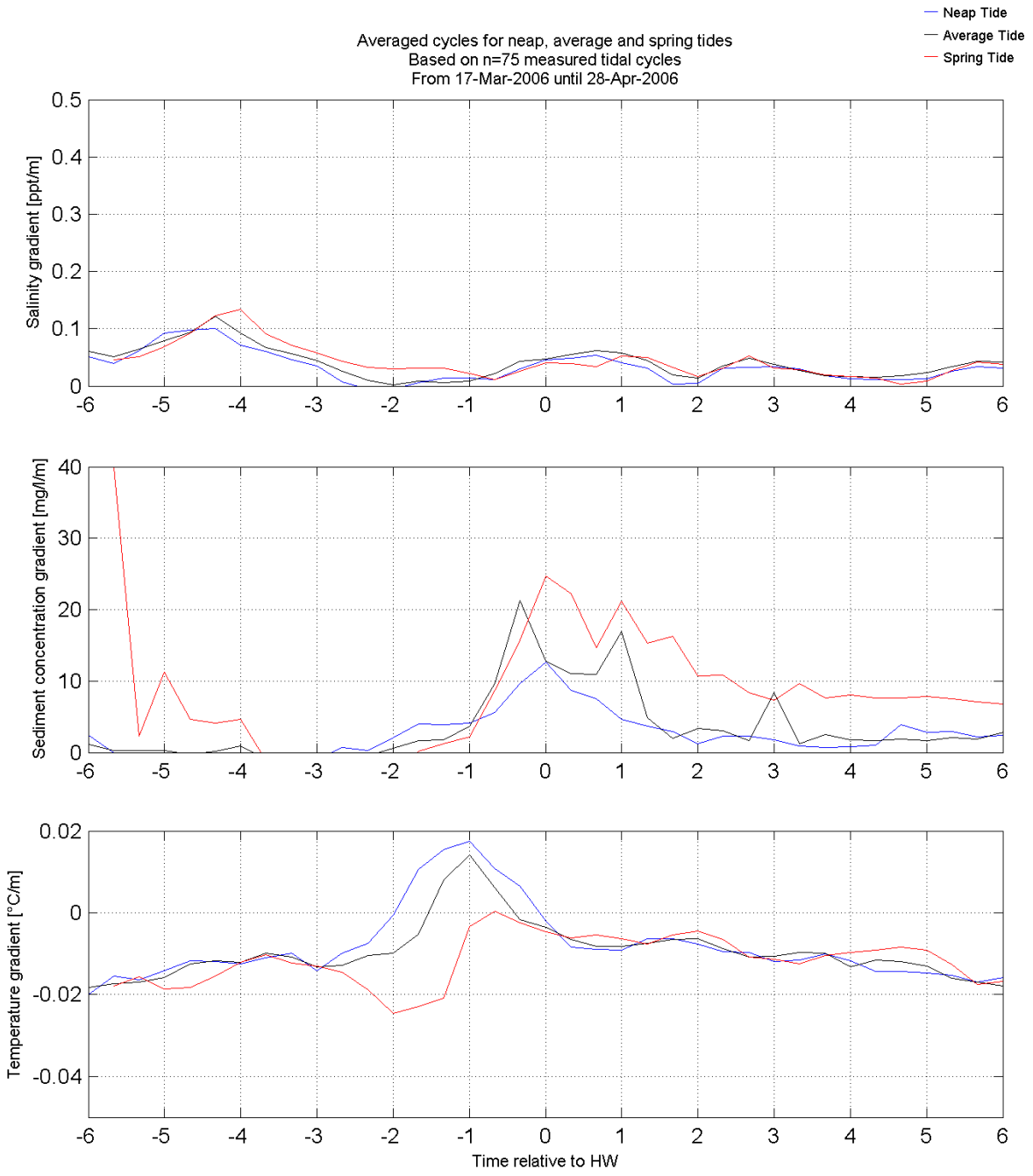
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-P&O2



Vertical gradient at S-ENTRANCE =(data(-14m) - data(-2m))/Δz

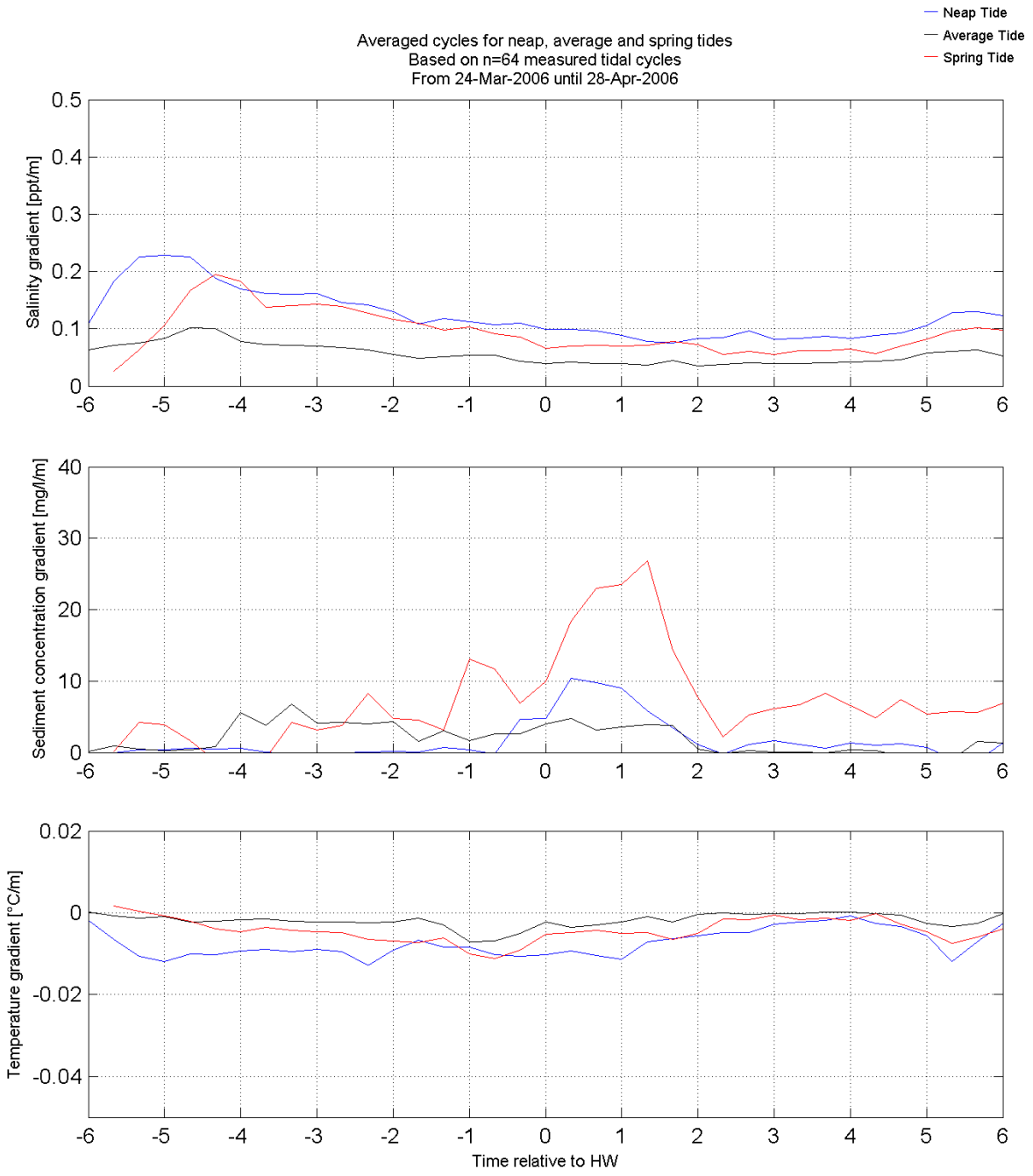
Data Processed by:

In association with :

I/RA/11283/06.121/MSA

Long Term Monitoring Siltation Deurganckdok

Spring 2006	Equipment(s): RCM-9
	Location: DGD-PSA



Vertical gradient at N-ENTRANCE =(data(-14m) - data(-2m))/Δz

Data Processed by:

In association with :

I/RA/11283/06.121/MSA